CURRENT HOUSING RESEARCH

VOLUME 12, NUMBER 1

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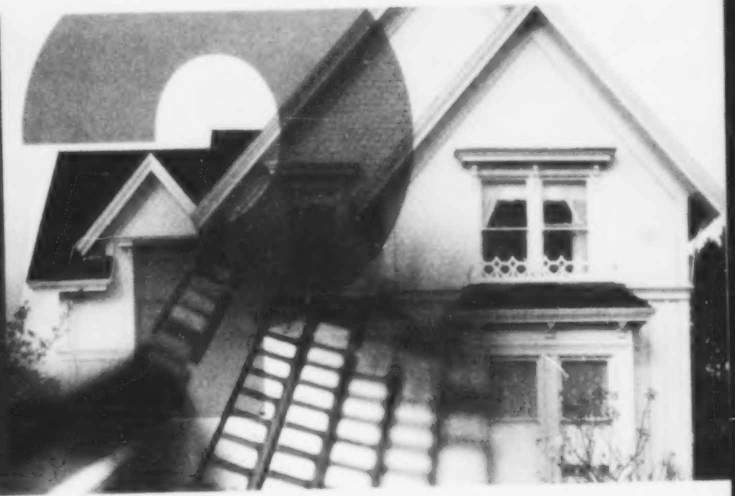
SOCIAL, ECONOMIC AND TECHNICAL RESEARCH



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HOME TO CANADIANS

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CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or research highlights listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa ON K1A 0P7
Fax (613) 748-4069
Telephone 1-800-668-2642
Email: chic@cmhc-schl.gc.ca

COMPLETED REPORTS REQUESTED

☐ Send copies of above reports, research highlights

☐ Add my name to your mailing list to receive *Current Housing Research*

Name		
Mailing Address (please include e-mail)		
City	Province	Postal Code

INTRODUCTION

Under Part IX of the National Housing Act, the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

Current Housing Research is compiled and produced two times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at http://www.cmhc-schl.gc.ca/en/Library/horetore/index.cfm

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);

- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "Completed Report."

- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

CMHC's External Research Program

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and non-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made annually to support research investigations into important questions, problems, and issues affecting Canadian housing. CMHC is interested in receiving applications on topics related to existing CMHC housing research.

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the professions and the housing industry may apply for these grants.

Full-time students at the graduate or under-graduate level are not eligible to apply. Students may be hired to assist in conducting the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must apply as a private consultant, and the proposed research must not be part of, or interfere with his/her regular work. CMHC employees are not eligible to receive grants under this Program.

To obtain the Guidelines and Application Form (product #62964):

- visit our Web site at http://www.cmhc-schl.gc.ca;
- e-mail: erp@cmhc-schl.gc.ca; or
- call 1 800 668-2642.

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TECHNICAL RESEARCH

BASIC HOME MAINTENANCE: FIRST NATIONS HOME OCCUPANTS' GUIDE

This home occupants' guide contains practical "how to" help for maintenance and repair work to keep a home in top condition. Performing minor repairs as soon as a problem appears will often prevent further damage and more costly repair at a later date. Benefits to home maintenance include saving money, making homes healthier, and making living environments more enjoyable for home occupants and the community.

The guide therefore helps First Nations' home occupants save money with a wide range of tips. The manual provides an introduction to basic home maintenance along with a home maintenance assessment checklist, and outlines advice on repairing siding, roofing, walls and ceilings, faucets and toilets, etc. The manual covers the maintenance of septic systems, healthy housing and indoor air quality, and provides advice on painting, cleaning, water heaters, controlling humidity and mold, heating and ventilation, appliance preventive maintenance and home safety issues.

Easy-to-understand instructions come complete with detailed illustrations and a glossary of housing terms.

Funded by Canada Mortgage and Housing Corporation, B.C. and Yukon Region, Aboriginal Capacity Development. Ottawa: CMHC, c2004. 117 pages

Nota: Aussi disponible en français sous le titre : Introduction à l'entretien des maisons : guide pour les occupants des Premières nations (OPIMS 63588)

STATUS : New Completed Report (Order number 63587)
AVAILABILITY : CMHC Information Products

CAPITAL REPLACEMENT PLANNING MANUAL & PRESENTATION MATERIAL - ON RESERVE

This project will support On-Reserve Housing. The overall outcomes will be: The Capital Replacement Planning manual and training material will provide guidance and training to On-Reserve Housing Providers and help them to maintain the current housing stock and ensure the replacement of capital items are planned for and completed in a timely manner, and that Replacement Reserve Funds are adequately funded to meet these needs. The project will result in the production of a comprehensive manual on Capital Replacement Planning for First Nations. Training material based on this manual will also be produced.

CMHC Project Officer : *Fatima M Barros*
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available

CIDN : 29481500
STATUS : Ongoing
NEW

REMOTE FIRST NATION SUSTAINABLE DEVELOPMENT

Nasko is a remote First Nation community in British Columbia with no water and waste treatment systems and with housing that is not connected to the electrical grid. The community is in dire need of these basic facilities, however, conventional infrastructure does not exist and would be too costly to install. Micro-systems may be feasible and viable to address the need. A micro-infrastructure system (e.g. Eco-Nomad) can provide communal water, waste water and basic power supply. Rehabilitation of the existing units, including basic plumbing and electrical fixtures, is being undertaken with assistance of the Residential Rehabilitation Assistance Program (RRAP).

CMHC Project Officer : Alain Croteau
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available

CIDN : 30581500
STATUS : Ongoing

BEST PRACTICE GUIDANCE: FLANKING SOUND TRANSMISSION

A Best Practice Guide specific to multi-family wood-frame construction, is being developed (with industry collaborators) to address both airborne and impact sound insulation for dwellings separated by a partition wall or partition floor. With CMHC's direction and close consultation, the Institute for Research in Construction (IRC) will summarize the results of this project and the previous flanking projects in an integrated guide for builders and architects. Flanking sound control for wood frame row and apartment construction using generic products will be presented, including a discussion of the concepts (explained graphically using simple figures), identification of the important transmission paths and their ranking, and a general discussion of possible treatment options. Engineered solutions for new and retrofit constructions will be provided by the tested architectural design details, described in terms of non-proprietary construction materials. The project began in December 2004, and an English version of the Best Practice Guide is expected for December 2005.

CMHC Project Officer : *Barry Craig*	***CIDN*** : 29760200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

BASEMENTS, FOUNDATIONS & CRAWLSPACES

ANALYSE DES DOMMAGES STRUCTURAUX DE BÂTIMENTS RÉSIDENTIELS ASSOCIÉS AUX PROBLÈMES DE REMBLAIS PYRITEUX

In recent years, many cases of structural and aesthetic damage caused to buildings have been associated with the heaving of concrete slabs. Studies conducted on these infrastructures have shown that the swelling of the granular foundations composed of pyritic clay shales was the main cause of the problem.

This study is aimed at making an inventory of different cases of single-family residences affected by problems possibly related to the swelling of the pyritic foundation backfills on the South Shore of Montréal. The mandate given in this regard to the Université de Sherbrooke and the École Polytechnique de Montréal and organizations involved under the auspices of the Comité technique québécois (CTQ), by Canada Mortgage and Housing Corporation (CMHC), was to inspect at least 200 cases inventoried in three municipalities on the South Shore of Montréal. In the end, nearly 800 cases were considered and at least 200 were subject to a particular examination on site. In cases where the swelling was at its initial stage or in full expansion, appropriate instrumentation was put in place to track the progress of the different movements. This course of action could explain certain complex cases where several mechanisms could be involved, including sulphate action or shrinkage mechanisms, as well as geotechnical problems, not to mention the swelling process. It emerged from this study that the garages were mainly affected by swelling problems, while the basements seemed impacted in almost equal proportions by swelling and sulphation/swelling problems. The swelling accompanying the sulphation may have come from either the swelling of the backfill under the concrete slab or the swelling of the concrete slab (delamination).

A study of the main symptoms revealed that the heaving occurrences, in the 197 garages that were visited, measured between 1 mm and 30 mm in 70% of the cases, while the heaving occurrences, in the 224 basements that were visited, measured between 1 mm and 15 mm in 32% of the cases, with no heaving in 58% of the cases. Again concerning the symptoms, the cracks most often encountered were mainly star-shaped or longitudinal in the garages and only star-shaped in the basements. The presence of whitish powder around the cracks and at the slab-wall joints was rarely observed either in the garages or the basements. However, this powder may have been removed by the owners before the visits for reasons of hygiene or cleanliness.

In the garages, more than 85% of the cases involving cracks in the foundation walls appeared to be linked to the presence of pyritic shales swelling in the backfills. In the basements, there were often no cracks or minor cracks, which could frequently be attributed to a phenomenon other than the backfills.

The residences that were subject to more in-depth investigations revealed that the swelling process is attributable to the presence of pyritic backfills. The expansion that has been generated does not seem to be showing any signs of slowing down and will continue as long as sulphides are available in the aggregates and the temperature and humidity conditions remain similar in the backfills. For these residences, to limit the damage, it would be reasonable to replace the backfill with another aggregate certified as non-swelling in accordance with the CTQ M-100 procedure.

Pyritic shales or schists are totally excluded from any eventual use. In existing cases, their replacement with other non-swelling aggregates should be planned. For backfills that are not compacted, and which therefore have a certain porosity (voids index), the injection of sealants, such as sulphate-resistant cement, can be considered to stop the swelling. However, this procedure is recommended for basements that usually have clean stone with a less thick layer of backfill than in the case of garages.

Prepared by Gérard Ballivy, Achour Bellaloui, and Patrice Rivard, Laboratoire de mécanique des roches et de géologie appliquée, Département de génie civil, Université de Sherbrooke. CMHC Project Officer: Jacqueline Meunier-Bureau. Ottawa: Canada Mortgage and Housing Corporation, 2004. 62 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/CHIC%20Analyse(w).pdf

LONG TERM PERFORMANCE OF SLAB-ON-GRADE FOUNDATIONS IN REGINA SASKATCHEWAN: FINAL REPORT

This study is an investigation of the long-term performance of slab-on-grade foundations for low-cost houses built in Regina, Saskatchewan from 1955 to 1960. These shallow foundations and other innovations made it possible to construct 90 m^2 (969 $feet^2$) houses on 15 m by 37 m (50 foot by 100 foot) lots which sold for under $10,000. Unfortunately, for many of these houses, the swelling and shrinking behavior of the deep Regina clay subsoil soon began to affect their shallow foundations. Occupants noticed during the first few years of occupancy that the central areas of the floor appeared to be settling and partition walls appeared to hang from the roof trusses. This "dishing" of slabs was more pronounced in winter and somewhat relieved in summer. A number of houses were mud jacked to restore to level. This procedure was not a permanent fix and movements of treated and untreated slabs continued both seasonally and over the longer term.

In 1960 the Prairie Regional Station, Division of Building Research, National Research Council of Canada was invited to monitor the behaviour of these and other innovative foundations built at that time. Monitoring continued until the late 1970's when the houses were approximately 20 years old. This investigation in 2003 re-examines these houses after approximately 45 years of service.

The combined effects of covering the ground with an impermeable slab, shading by the building, irrigating, planting trees and shrubs, snow clearing and disposing of roof drainage created new dynamics for subsoil moisture which in turn caused new swelling or shrinking reactions by the clay rich subsoil. Where no trees were planted close to slabs, the slabs progressively heaved at different rates depending upon exposure and moisture availability. This heaving might typically exceed 100 mm (4 inches). Where deep-rooted vegetation grew too close, the affected floor slab might have settled 100 mm (4 inches) or more. Where slabs-on-grade are impacted by both swelling and shrinking subsoil the differential movements can exceed 200 mm (8 inches). In spite of such large distortions all of the original slab-on-grade houses are still in service.

Without major changes in design and construction to cope with or eliminate these large and on-going ground movements it is not recommended that slab-on-grade foundations be chosen in future for houses in Regina or other locations having similar geology and climate.

Prepared by J.J. Hamilton. CMHC Project Officer: Ken Ruest. Ottawa: Canada Mortgage and Housing Corporation, 2004. (External Research Program Research Report) 40 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/slab%20on%20grade%20report(w).pdf

BUILDING CODES

CODE REQUIREMENT AND COSTS OF INCORPORATING ACCESSORY APARTMENTS

The purpose of this research project is to investigate the various code requirements (building, fire, plumbing, etc.) that restrict the provision of accessory apartments in a dwelling. This project will list in plain English all National Building Code (NBC) requirements that apply to residential buildings with one principle apartment, but that differ from the requirements for a single family house. The project will recommend changes to the NBC to facilitate the construction of code-complying accessory apartments in existing houses, and assess the impact of the proposed changes on occupant safety. The project will estimate the costs of compliance with the NBC, and the costs of employing the proposed changes, for a representative sample of new and existing homes. The findings will be presented in a research report intended for the use of designers, housing providers and building officials. The report should be complete by July, 2005.

CMHC Project Officer : *Barry Craig*	**CIDN** : 28830200
Division : Policy and Research Division	**STATUS** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

DEVELOPMENT OF TRANSITION TRAINING FOR OBJECTIVE-BASED CODES

Under the auspices of the Canadian Commission on Building and Fire Codes (CCBFC), CMHC is contributing to a partnership of National Building Code stakeholders to develop transitional training material for the objective-based codes which will include pilot testing. Content will provide for training on the structure, and new information to be included in the 2005 objective-based code, on the evaluation of alternative solutions to be allowed under objective-based codes (for example, using sprinklers in lieu of fire separations), on assessment criteria to allow for transferability of alternatives and their impact on other code requirements, on preparation of knowledge tests, on development of an instructor's guide, and on pilot testing. As provincial, territorial and municipal code enforcement officials have the most comprehensive information requirements, material will be developed at their level and then adapted for other stakeholder groups to meet their needs. Training material has been developed in this multi-year project. Pilot-testing is underway, to be completed by fall 2005. The training material will be available for the various audiences in three delivery modes: Basic Awareness, Independent Learning, and Classroom/Workshop Delivery by instructors/facilitators.

CMHC Project Officer : *Darrel Smith*	**CIDN** : 27000200
Division : Policy and Research Division	**STATUS** : Ongoing
AVAILABILITY : Seminar/training is not yet available	

BUILDING CODES

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The airtightness standard used for testing houses dates back to 1986. The object of this project is to re-write CAN/CGSB-149.10, incorporating some updates and some alternative techniques. There have been no meetings up until now but there has been extensive consultation by e-mail and document review. Progress has been delayed due to the lack of consensus by committee members. A new draft of the document is available. The CGSB will be re-balloting the draft of this standard.

CMHC Project Officer : Don Fugler
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 19710200
STATUS : Ongoing

BUILDING MATERIALS

CHARACTERISTICS OF EFFECTIVE WATERPROOF SEALERS FOR MASONRY

The objective of this project is to study the vapour permeability characteristics of effective sealers applied to masonry walls; the issue is not one of stopping water absorption/penetration into the masonry, since most sealer products are effective in this role, but of assessing how the sealers affect drying of the masonry. CMHC in partnership with Masonry Canada, is providing funds to the University of Waterloo to undertake this preliminary study. This phase of the project will investigate the performance of 5 sealer types on individual masonry units and small masonry panels. Computer modeling and parametric analysis will be undertaken to demonstrate the impact of insulation levels, driving rain exposure, water absorption, orientation, imperfect air barrier, etc., for five representative Canadian climate zones. The project is expected to be completed by spring of 2006.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25610200
STATUS : Ongoing

DEVELOPMENT OF HIGH PERFORMANCE STUCCO FOR DURABLE HOUSING CONSTRUCTION

The objective of this research project is to investigate the opportunities to engineer a Portland cement stucco material that will limit liquid water entry on its external surface while at the same time allow water vapour to diffuse (dry) out of it. This research project considers stucco as a material component of an ideal wall system; it does not look into system performance. The effects of possible imperfections, which may occur due to prevalent construction practices, present in the wall system are beyond the scope of this investigation. CMHC undertakes this work in partnership with the National Research Council of Canada, Institute for Research in Construction (NRCC/IRC). The project is expected to be completed by the summer of 2006.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 27100200
STATUS : Ongoing
NEW

INITIAL MATERIAL CHARACTERIZATION OF STRAW LIGHT CLAY

Straw light clay (SLC) is a contemporary variant of earth building techniques, which have been a part of advanced civilizations for thousands of years. Africa, the Middle East, Asia, Europe and the Americas all have rich traditions in these techniques. Indeed, all of these regions have structures, which were built 500-1000 years ago with earth, often mixed with straw, frequently in combination with timber structural elements that are standing today. This serves as a testament to the endurance of the materials, as well as traditional knowledge.

Straw light clay (SLC) is prepared by coating a straw aggregate with a clay binder. This creates a versatile non-structural and insulative infill material with a very low embodied energy. Applications include exterior walls as well as interior partition walls.

This research investigates the thermal resistance and moisture related performance characteristics of straw light clay (SLC) in order to assess the viability of this material for Canadian climates, and the need for future research. In addition; fire resistance, shrinkage and swelling, compression and bending, and density were investigated to support the above mentioned objectives.

This research project consists of three major components:
1. Literature review;
2. Development and reporting of economical, reliable test methods, which are easily reproduced;
3. Publishing of data based on these tests, which reveal initial performance characteristics of one formulation of SLC.

The test program included:
1. Preparing a loam/clay mixture and producing samples from which test specimens were derived (80 in total).
2. Preparing specimens from three density classes (45 specimens in total) to be used in the tests.

This test program also investigated several material properties: thermal conductivity; vapour permeability; moisture storage; capillary absorption; compression and bending; fire resistance; and density.

The testing methodologies were developed with assistance of Dr. John Straube of the University of Waterloo. Section one provides an introduction and some technical background. In section two, the reader will find an extensive literature review. Section three details the material composition, and preparation of the samples. Sections 4-11 contain the test procedures and results. The discussion section of each of these chapters is dedicated to looking at the test from a practical, applied perspective. This discussion thread is summarized in the appendix section titled: Application to Enclosure Wall Design.

Prepared by J. Thornton. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 2004. (External Research Program Research Report) 139 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC-Initial(w).pdf

MECHANICAL PROPERTIES OF GYPSUM SHEATHING AFTER WETTING AND DRYING

This project is a follow-up to the 2003 CMHC External Research Project "Relationship Between Moisture Content and Mechanical Properties of Gypsum Sheathing." The purpose of this study is to examine the relationship between the mechanical properties and moisture content of gypsum sheathing products (such as standard gypsum wall board, exterior grade gypsum, glass-fibre faced gypsum) for materials that have been wetted and then dried to their original (dry) state. Specific properties to be examined include: adhesion or delamination of facer material, ability of the sheathing to resist fastener pull-out, flexural strength of the sheathing, for seismic considerations and as a common index of overall mechanical integrity and water absorption. The project is expected to be completed by the summer of 2005.

CMHC Project Officer : *Silvio Plescia* ***CIDN*** : 29850200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available ***NEW***

RELATIONSHIP BETWEEN MOISTURE CONTENT AND MECHANICAL PROPERTIES OF GYPSUM SHEATHING

The purpose of this study is to examine the relationship between moisture content and mechanical properties of gypsum sheathing products (such as standard gypsum wall board, exterior grade gypsum, glass-fibre faced gypsum). Specific properties to be examined include: adhesion or delamination of facer material, ability of the sheathing to resist fastener pull-out, flexural strength of the sheathing, for seismic considerations and as a common index of overall mechanical integrity and water absorption. The study will also determine whether hand-held electric resistance meters are suitable for measuring moisture content (accurately) or if some new apparatus or protocol is required. The project is expected to be completed by summer 2005.

CMHC Project Officer : *Silvio Plescia* ***CIDN*** : 26470221

Division : External Research Program ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

TEMPERATURE AND MOISTURE CONDITION OF WOOD STRUCTURAL MEMBERS EMBEDDED IN INTERIOR INSULATED SOLID MASONRY WALLS, MONITORING OF THE GROSH BUILDING, STRATFORD, ONTARIO

Two projects have been launched to monitor the temperature and moisture content of wood structural members (joists) embedded in interior insulated solid masonry walls. Houses with solid masonry walls in Kincardine, Ontario, and Wolsely, Saskatchewan that have been retrofitted with interior insulation have been fitted with the necessary instrumentation to monitor the moisture and temperature regimes in wood joists embedded in the masonry walls. Based on the monitoring, the long-term durability of the wooden members will be estimated. The outcome of these projects will be used in the formulation of guidelines for insulation retrofits in solid masonry and stone buildings. The projects will be completed by summer 2005.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 24290200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

BUILDING MATERIALS

TESTING THE ADHESION OF AIR BARRIER MEMBRANES IN WALL ASSEMBLIES

This project will design and conduct a testing program to ascertain the adhesion performance and risk of air barrier materials and assemblies using recent construction materials in actual assemblies. Specifically, the purpose of the research project is to determine the effect that exposure to sustained environmental conditions, wetting of the substrate, and material compatibility has upon the adhesion strength between air barrier materials and substrates. The project has been completed. The full report and a research highlight will be available in summer 2005.

CMHC Project Officer : *Luis de Miguel* ***CIDN*** : 25350200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Research highlight is not yet available

CONCRETE

EVALUATION OF A NON-DESTRUCTIVE METHOD FOR MEASURING THE PRE-STRESS FORCE IN UNBONDED TENDONS IN EXISTING POST-TENSIONED CONCRETE BUILDING

The objective of this project is to evaluate the effectiveness of a technique, developed by Halsall and Associates Limited, Consulting Engineers, for in-situ measurement of force in unbonded post-tensioned tendons. Unlike reinforced concrete structures which use reinforcing steel dispersed throughout the structure to carry loads, post-tensioned buildings use highly stressed, steel cables (coated with grease and inserted into plastic sheathing) strategically placed within the concrete slabs to resist the applied loads. The evaluation of post-tensioned buildings and the recommendation of appropriate remedial strategies have been hindered by a lack of diagnostic tools that can effectively assess the load levels in the cables themselves without destroying the cables. This project will identify the strengths and limitations of this technique. The completion date for this project is expected to be December 2005. The results of this evaluation will be made available to engineering practitioners specializing in the investigation and repair of concrete buildings and structures.

CMHC Project Officer : *Silvio Plescia* ***CIDN*** : 23940200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This study was initiated to address concerns raised at a round-table discussion convened by Canada Mortgage and Housing Corporation to discuss concrete deterioration and repair issues for buildings. It was generally agreed that there is no consistent approach to concrete investigations and repairs and that the development of an assessment and repair protocol would be beneficial. In achieving a concrete repair protocol, the first step is to identify the state-of-the-art and the current practice for investigation, repair and monitoring strategies. State-of-the-Art is considered to be the highest level of technology in the field at this time and Current Practice is considered to be the procedures that are in general or prevalent use by most consultants. This project will research current assessment, monitoring and repair strategies for concrete repair employed by engineering consulting firms commonly involved in concrete investigation and restoration projects. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (e.g. CSA) will be catalogued. This project is expected to be completed by summer 2005.

CMHC Project Officer : *Silvio Plescia* ***CIDN*** : 1890 0200002

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

CONSUMER INFORMATION

CREATION OF CONTENT FOR "ABOUT YOUR APARTMENT" FACT SHEETS

This project will review the potential information needs of both the occupants and owner-managers of multi-unit residential buildings. Key topics ranging from resolving indoor air quality, water penetration, occupant comfort, saving energy and water, through to security and safety will likely be covered. Much of the potential material will be developed from existing CMHC research and publications. The information will be organized into fact sheets that consumers and property owner-managers can use to solve problems in their buildings. The project outcome will be the creation of a capability within CMHC to address the information needs on a point by point basis similar to the About Your House series for consumers who live in multi-unit residential buildings and the property owners and managers who operate them. The first 10 publications will be completed by December 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31660200
STATUS : Ongoing
NEW

DOORS AND WINDOWS

ACCELERATED TESTING TO CONFIRM A METHOD TO PREDICT TIME TO FAILURE OF INSULATING GLASS UNITS

This research, under CMHC's External Research Program, will validate an accelerated test method to estimate the failure rate of insulating glass units (IGUs) with a view to ascertain shelf life of units installed in existing buildings. This will allow for more accurate prediction of replacement costs within reserve funds. Insulating glass units in windows have a finite life span and are expensive to replace. A test method has been developed and testing is required to assess its validity. The study will test twelve IGUs under repeated cycles of exposure to elevated temperature and humidity levels. This will increase the cavity moisture content and thus the dew point temperature. Units will be exposed on one side at normal room conditions and varying outdoor temperatures on the other side. A mathematical model will be produced to predict future dew point temperatures and time to failure. Subsequent dew point measurements will prove the model true or false; if false, new models will be developed. By the time failure is achieved, it is hoped that an accurate model for failure prediction can be produced. A research report is expected in the winter of 2005/06.

CMHC Project Officer : *Luis de Miguel*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370218
STATUS : Ongoing

BEST PRACTICE GUIDE - WINDOWS

In partnership with Natural Resources Canada and the Homeowner Protection Office, CMHC is developing this comprehensive and practical technical advisory document for architects, engineers, builders, renovators, window manufacturers, window installers and others involved in the design, specification, construction, installation and interfacing of windows within the exterior wall assembly in both low-rise and high-rise residential construction. This document will guide the user in selecting the appropriate window performance criteria for the intended application and to provide installation details to ensure the performance criteria is achieved through the effective continuity of thermal, air, vapour and moisture barriers at the interface between the window units and the wall assembly. The project is expected to be completed by the spring of 2006.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30870200
STATUS : Ongoing

DOORS AND WINDOWS

EVALUATING THE EFFECTIVENESS OF WALL-WINDOW INTERFACE DETAILS TO MANAGE RAINWATER

Based on the need for effective window-wall interface details to manage water intrusion, CMHC is proposing to develop and publish a Best Practices Guide for Window Installation that will be applicable to both low-rise wood frame construction and high-rise buildings. To support the development of the Guide, and the needs of the fenestration, wall cladding and flashing industry, CMHC in partnership with the National Research Council (NRC) is building a consortia of interested North American organizations to evaluate specific window-wall interface details to determine how effective they are in managing rainwater; CMHC and NRC are funding the first year of this 3-year intended study. The Phase I study will be completed by end of summer 2005 at which time the results will be made public.

CMHC Project Officer : Silvio Plescia
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 27080200
STATUS : Ongoing

WINDOW INSTALLATION COURSE - DEVELOPMENT AND DELIVERY

The objective of this project will be to develop a 'Window Installation' course. The course will be directed at those trades, or trades persons, charged with the installation of windows. The course will cover window installation in both low-rise and high-rise construction assemblies. The course will introduce to the installer the fundamental building science concepts required to integrate window and envelope performance criteria. This project will be contracted during the development of CMHC's Best Practice Guide - Windows. This project will be completed by spring of 2006.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30700200
STATUS : Ongoing

ENERGY CONSERVATION

AIR LEAKAGE CONTROL DEMONSTRATION PROJECT IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will assess the individual and collective impact of air sealing measures on building envelope air leakage characteristics, building energy consumption, indoor air quality and occupant comfort in multi-unit residential buildings. Air sealing products and measures will be documented for common air leakage points. The predictive capabilities of existing air leakage models will be assessed by comparing their estimates of annual energy savings with that actually achieved in practice. Currently two air leakage control projects are underway. One project in Moncton, New Brunswick has completed the estimation of the costs and benefits of an air leakage control project in a large rental apartment building. The proposal to undertake the air leakage control work is being considered by the building owner. The second project is in Regina, Saskatchewan and the air leakage control work has been completed. The assessment of the costs is underway and the impact of the air leakage control measures on energy consumption will be estimated based on energy metering over the next year. This project will be completed by December 2006.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30410200
STATUS : Ongoing

ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

The potential for energy and greenhouse gas emission reductions in multi-unit residential buildings due to the implementation of energy efficiency measures is being assessed using the building files of the CMHC HiSTAR database. Two projects are currently underway to assess the extent to which multi-unit residential buildings must be retrofitted in order to meet 10%, 20% and 40% reductions in energy use. The studies are limited to the HiSTAR database due to the lack of available information on the total number of multi-unit residential buildings in Canada. In a related, interdepartmental project, an energy and green house gas emission simulator (BESET) has been developed by Natural Resources Canada to analyze the impact of individual, or packages of, energy efficiency measures on the energy consumption and green house gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and green house gas emission reductions can be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The two CMHC reports that are studying the retrofit potential of multi-unit residential buildings have been completed and are under review. The reports will be available by summer 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22490200
STATUS : Ongoing

CHARACTERIZATION OF ENERGY AND WATER END-USE LOAD PROFILES IN HOUSING: LITERATURE REVIEW

CMHC, in cooperation with Natural Resources Canada, conducted a literature review of energy and water end-use load profiles, interior heat gain, monitoring and analysis methodologies in residential buildings. The project identified what data is available on energy and water end uses, research projects, data, monitoring protocols and published information relating to energy and water load profiles of housing. The study concluded that consistent, accurate and detailed load profiling data is not available for all end-uses in dwellings, particularly multi-unit residential buildings. CMHC and NRCan plan to develop a load monitoring protocol that will be used to gather data in both single family and multi-unit residential buildings in a consistent and systematic manner. Upon completion of the protocol, load monitoring projects will be conducted in dwellings across Canada. The results of the load profiling literature search will be made available in a CMHC research highlight by summer 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22010200
STATUS : Ongoing

CMHC ENERGY EFFICIENCY CASE STUDIES MOLE HILL COMMUNITY GROUND SOURCE HEAT PUMP CONVERSION PROJECT

A project has been initiated to document, as an energy efficiency case study, the conversion of the dwellings of the Mole Hill Community to ground source heat pump systems. The project will describe the situation that led to the decision for the conversion, the design, installation and commissioning, and the post installation performance of the systems. The annual energy use of the project, after the conversion and any resultant cost savings will also be identified. The project will be completed by summer 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 18990200
STATUS : Ongoing

COMMUNITY BASED APPROACH TO HOUSEHOLD ENERGY SAVING

This CMHC External Research Program (ERP) project will examine the potential success of a community-based approach to encourage homeowners to save energy and greenhouse gases, rather than their acting as individual householders. The work has commenced in an Ottawa neighbourhood and will continue to 2006. The NRCan Energuide for Houses program has been used for house testing and to produce recommendations for house modifications. The community group will encourage participation in the process; follow the progress of changes to the house and its heating systems; monitor the effectiveness of measures undertaken; and review with homeowners their expectations and realizations about the process.

CMHC Project Officer : *Don Fugler*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370217
STATUS : Ongoing
NEW

DESIGN SURVEY OF LOW ENVIRONMENTAL IMPACT HOUSING

This research project will provide a documentation of the best existing examples of low environmental impact housing forms (including net zero energy) to date in Canada and internationally in similar climates. The project is supported through the PERD (Panel for Energy Research and Development) program. The goal is to eventually establish criteria and specifications for zero environmental impact housing in Canada, develop best practice models towards achieving this goal, and ultimately demonstrate these "deep green" housing models for Canadian climatic regions. The completed research report is expected in late 2005.

CMHC Project Officer : Thomas Green
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25400200
STATUS : Ongoing

DEVELOPMENT OF A CONTRACTOR'S AIR LEAKAGE CONTROL MANUAL AND SEMINAR SERIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in consultation with members of the air barrier-air leakage control industry, will develop an air leakage control manual for multi-unit residential buildings. The manual will provide contractors with information on how and where air leakage occurs in these buildings and techniques that can be used to seal them. The goal of the project is to provide the training material necessary to support the development of an air leakage control industry that will be available to meet the needs of the multi-unit residential building sector and to promote air leakage control as a cost effective way to reduce energy consumption in buildings while addressing other issues such as building envelope durability and occupant comfort. The content for the manual will be completed by July 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32080200
STATUS : Ongoing

ENERGY EFFICIENCY AND RETROFIT IMPLICATIONS OF BUILDING RECOMISSIONING SURVEY

CMHC, in cooperation with Natural Resources Canada, conducted a literature survey of the availability of recommissioning guidelines and other "tune-up" procedures for multi-unit residential buildings. The survey found that there was no single source of published information for enhancing the performance of multi-unit residential buildings via low and no-cost measures. Information was found to be available for individual measures to improve space heating, domestic hot water, lighting and appliances, building envelope and ventilation systems. Given the absence of recommissioning, or tune-up, guidelines for multi-unit residential buildings but the availability of information for discrete building systems from a wide variety of sources, the project concluded that CMHC should initiate a subsequent project to compile the measures into a single Tune-Up Guide for Multi-Unit Residential buildings. The project is complete. A Research and Development Highlight detailing the findings of the literature search will be published by July 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 23590200
STATUS : Ongoing

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing. The case studies currently underway include:

1. Conservation Co-op, Ottawa;
2. Dual Fuel Heating System, Oshawa;
3. Energy Efficiency Retrofit of an Apartment Building, Toronto;
4. Case Studies of Interior Insulation Retrofits in Buildings with Solid Masonry Walls (CMHC "A" Building, Ottawa; Lofts Corticelli, Montréal; Karcher Building, Prince Albert);
5. The Complete Rehabilitation of the Broadview Apartment building;
6. The performance of an apartment building equipped with a Water Loop Heat Pump System.

The case studies will be published as a part of the CMHC Better Building Series starting July 2004.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 18990200
STATUS : Ongoing

MEASURING HOUSING SUSTAINABILITY - ANNEX 31 - ENERGY RELATED ENVIRONMENTAL IMPACT OF BUILDINGS

Annex 31 is a project established under the auspices of the International Energy Agency's (IEA) Agreement on Energy Conservation in Buildings and Community Systems, for which CMHC is the designated Operating Agent (project manager). The mandate for the Annex 31 project is to provide information on how tools and assessment methods might improve the energy-related impact of buildings on interior, local and global environments. The ultimate objective is to promote energy efficiency by increasing the use of appropriate tools by practitioners. Through collaborative research and communications by 14 participating countries, the goal of Annex 31 is to advance the capability and reduce the cost of estimating the energy related environmental effects of buildings, and to increase awareness of the importance of including such estimation in the design process. The end product for the project will be a final Annex 31 report, web-site and CD-ROM available in summer 2005. The project scope includes a description of tool theory and methods, a directory of tools, case studies, and research reports on how tools perform. The Annex 31 report may be of interest to users of tools, to groups engaged in tool design, and to anyone establishing policy and guidelines for promoting better decision-making within the building sector.

CMHC Project Officer : *Thomas Green*
CIDN : 16290300
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

SHORT CONSUMER PIECES ON ENERGY SAVINGS IN SPECIFIC HOUSING STYLES

This research produced a series of short consumer information pieces describing options for improving the energy savings in older houses, targeted at specific house design types. CMHC has three longer publications available or pending that are specific to a single house type. This CMHC PERD (Program for Energy Research and Development) initiative provided the same design-based advice to renovators and homeowners, but in a shorter format, with the most effective energy retrofits prioritized for each housing style. The final reports are available on CMHC's web site in the series "Renovating for Energy Savings". The following items have been produced:

- Issue 1: Pre-World War II Houses (2004 -- 6 pages) (Order number 63643)
- Issue 2: Post-War 1 1/2 Storey Homes. (2004 -- 6 pages) (Order number 63704)
- Issue 3 : Post-60s Two-Storey Homes. (2004 -- 6 pages) (Order number 63681)
- Issue 4: 1960s or 70s One-Storey Homes (2004 -- 6 pages) (Order number 63706)
- Issue 5: Split-Level Homes (2004 -- 6 pages) (Order number 63708)
- Issue 6: Split Entry Homes (2004 -- 6 pages) (Order number 63710)
- Issue 7: Mobile Homes (2004 -- 6 pages) (Order number 63712)
- Issue 8: Duplexes and Triplexes (2004 -- 6 pages) (Order number 63714)
- Issue 9: Row Houses (2004 -- 6 pages) (Order number 63720)
- Issue 10: Homes with Walkout Basements (2004 -- 6 pages) (Order number 63716)
- Issue 11: Common Additions (2004 -- 6 pages) (Order number 63718)

STATUS : New Completed Fact Sheets
AVAILABILITY : CMHC Information Products and the CMHC Web site

STRATEGIES FOR ALTERNATIVE ENERGY USE AND REDISTRIBUTION AT THE BUILDING ENVELOPE

As part of a three year PERD initiative, integrated consultant teams explored the potential strategies to reduce, generate or recover and redistribute energy at the building envelope of multi-unit residential buildings for Prairie, Vancouver, Toronto and Halifax locations. The teams include expertise in building management, and development, as well as architectural, engineering and energy simulation. Each team developed recommendations for the strategies most feasible in their study areas. In Montreal a charrette led by NRCan explored sustainable strategies for a mixed-use project which includes retrofit and new commercial and residential development. The findings of the Prairie team have been used to develop strategies for a housing development in Regina. A commentary of the strategies, representing analysis of building envelope-related energy strategies for Halifax, Toronto, Calgary, and Vancouver has been written.

CMHC Project Officer : *Sandra Marshall* ***CIDN*** : 08400306
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Research highlight is available

SUPPORT FOR IEA ANNEX 39: HIGH PERFORMANCE THERMAL INSULATION SYSTEMS

The International Energy Agency has launched an R&D program to research high performance thermal insulation systems for buildings. The project will focus on vacuum insulation panels that can achieve, in theory, an insulating value of R75 per inch. Vacuum panels represent an order of magnitude improvement over conventional insulating materials, thus the energy saving potential for both new and existing buildings is enormous. Plans are being developed to organize and run a demonstration project using vacuum panels in order to assess their application and performance in buildings. CMHC will be supporting Canada's contribution to the IEA project, led by NRC's Institute for Research in Construction, and will be able to disseminate the results to the housing industry. Canada has also been asked to participate in the development of an International Standard for Vacuum insulating panels as a part of the IEA effort. The project is currently underway and will be completed by January 2006.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 30450200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

UNDERSTANDING MULTI-RESIDENTIAL ENERGY AND WATER END-USE LOAD PROFILES

Energy used in residential buildings is a major energy use in Canada (21% of all energy) and presumably in most areas in the Northern hemisphere. A substantial fraction of this energy (24%) is used in multi-residential buildings. However, very little attention has been given to examining the patterns of energy and water consumption, let alone how they can be improved. This report suggests that significant savings and improvements in the efficiency of multi-residential systems are achievable, and this could go a long way toward reducing energy usage and fulfilling Canadian Kyoto obligations.

Watershed Technologies Inc. and OZZ Energy Solutions Inc. have been monitoring energy and water usage in multi-residential buildings in the Toronto area since 1996. The present analysis looks at detailed (hourly) gas and electricity loads in 34 buildings and water consumption in 21 buildings over a two-year period from May 2001 to April 2003. An earlier report by OZZ documented the different physical features of these buildings and presented an overall summary and a preliminary analysis of gas, electricity and water consumption data along with daily and seasonal summaries. A more detailed analysis is offered in the present report.

ENERGY CONSERVATION

A new model is developed which describes the building's energy consumption for cooling and heating more effectively than the traditional degree-day model. The new model quantifies not only the changes in energy load per unit change in temperature but also its effective thermal capacity, the heating system overhead and system response to other weather factors, namely wind, relative humidity and solar access.

More than two fold differences in the energy per unit area or water used per apartment unit among the buildings are observed. A study of seasonal and daily variability suggests that at least a part of these differences in the building energy efficiency can be attributed to poor or complete lack of energy management in many of the buildings.

The data also suggests that in-suite electric heating is 2.5 times more efficient than central gas heating systems in multi-residential buildings. The same appears true of in-suite air conditioning, when compared to centralized cooling systems.

Prepared by J.E. Paloheimo and Douglas Hart, Watershed Technologies Inc. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 2004. ca. 68 pages (External Research Program Research Report)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC-Energy(w).pdf

FIRES & FIRE PREVENTION

CLEANING UP YOUR HOUSE AFTER A FIRE

"What to do After a Fire" is a CMHC About Your House consumer publication to help homeowners deal with fire damage in their homes. This publication explains the steps to be taken after the fire, and the various issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies. This information piece will be available summer 2005.

CMHC Project Officer : *Ken Ruest*
Division : Policy and Research Division
AVAILABILITY : Product is available on the web

CIDN : 2298 0200001
STATUS : Ongoing

EVALUATION OF COMPRESSED AIR FOAM SPRINKLERS

Automatic fire sprinklers that use large quantities of water to suppress fires are often unsuitable in remote and northern communities, when the water supply is scarce. The project will modify existing compressed air foam (CAF) sprinkler technology developed by NRC for institutional and commercial use, for single- and multi-family housing. Under the direction of Dr. Andrew Kim at NRC, the project will demonstrate compressed air/foam sprinklers which require a fraction of the amount of water used by conventional sprinklers, in a residential application suitable for use in northern and remote communities. A prototype will be tested in a controlled fire in a vacant house. The project will be complete by the spring of 2006.

CMHC Project Officer : *Barry Craig*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24680201
STATUS : Ongoing
NEW

FIRES & FIRE PREVENTION

FIRE PREVENTION MANUAL AND VIDEO: A HOUSING MANAGER'S GUIDE

The objective of this research is to identify the types of fire-related problems encountered in First Nation communities and their impacts on housing, to determine and document possible solutions to alleviate the problems and impacts, and to produce a user-friendly, plain language manual that will assist housing managers to understand and prevent fire issues along with a film targeted to community members concerning fire prevention and safety.

CMHC Project Officer : *Marcelle M Gareau*	***CIDN*** : 31830200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

HEATING AND VENTILATION

ANALYTICAL MODEL OF EARTH TUBE VENTILATION SYSTEMS

The objective of this External Research Program project was to determine the conditions under which exterior ground-buried ducts (earth tubes) could be used effectively. The work determined heat and moisture gains and losses for these systems under Canadian conditions. A draft final report has been received with conclusions: earth tubes do not appear to offer significant cost or performance advantages over heat and energy recovery ventilation systems, while introducing greater uncertainty in terms of performance and condensation control. Therefore heat and energy recovery ventilators would be the normally preferred approach to reducing ventilation energy use in housing. Minor revisions are being incorporated into the contractor's final report.

CMHC Project Officer : *Chris Ives*	***CIDN*** : 24370213
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

CAN/CSA F326-M91 (R1998), RESIDENTIAL MECHANICAL VENTILATION SYSTEMS

CMHC has been supporting the revision of CAN/CSA F326-M91 (1998), Residential Mechanical Ventilation Systems, with a financial contribution for the Canadian Standards Association (CSA) to act as secretariat, through separate contracts to consultants researching various aspects of the standard, and through CMHC participation in the task group work of the Committee. Significant changes to the standard are likely. Technical review is in progress and the standard should be ready for balloting by mid-2005.

CMHC Project Officer : *Don Fugler*	***CIDN*** : 20620200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The objective of this project was to undertake a field investigation of the ventilation and infiltration in a residential high-rise building. CMHC, in cooperation with the Institute of Research in Construction, monitored indoor-outdoor air pressure regimes in a high-rise for a period of one year. Ventilation system performance was also assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, are used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings. A report and research highlight documenting the results of the project will be available by July 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 19340200
STATUS : Ongoing

CHARACTERIZE THE PERFORMANCE OF A WATER LOOP HEAT PUMP SYSTEM IN A MULTI-UNIT RESIDENTIAL BUILDING

Two-pipe water loop heat pump systems represent an innovative approach to heating and cooling multi-unit residential buildings. The system consists of a central water distribution system that distributes moderately warm water to each apartment in the winter and cool water in the summer. An in-suite heat pump fan coil unit is then used to heat or cool the apartment depending on the season using the central water loop as a heat source or a heat dump. In theory, the system will allow for simultaneous heating and cooling of different areas of the building by redistributing heat to where it is needed. This ability is thought to offer significant energy savings but the extent to which this may be the case has not been evaluated. CMHC is undertaking a project to characterize the performance of a water loop heat pump system in a multi-unit residential building in Ottawa so that the potential for energy savings can be assessed. The project will evaluate energy consumption, and operational and maintenance issues over a one-year period. Recently, all of the heat pumps in the building have been converted to newer units with higher efficiency. The project will monitor energy consumption over the coming year to determine the annual energy savings associated with this upgrade. The project will be completed in November 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 18990200
STATUS : Ongoing

CONSERVATION CO-OP – CORRIDOR OVERHEATING REMEDIATION STUDY

The Conservation Co-op is an innovative multi-unit residential building that has adopted many advanced, or green, building practices in the design, construction and operation of the building. One of the features of the building is the use of passive cooling and solar shading to maintain comfortable summertime conditions in the building. Unfortunately, hot and humid conditions in the summer creates highly uncomfortable temperatures in the corridors and apartments of the building. Preliminary indications are that the heat recovery ventilation system for the building does not adequately ventilate the common spaces and may even contribute to overheating by delivering hot, humid outdoor air to the building. A project has been launched to assess the ability of a temperature and humidity controlled auxiliary cross ventilation system in the corridors to improve conditions. Similarly, the rooftop HRV systems that supply air to the corridors and apartments will be investigated to determine if the supply air function can be deactivated when outdoor air conditions are too hot and humid, and activated to take advantage of cooler outdoor conditions. The project will aid in the assessment of strategies to use night-time cooling to help maintain improved indoor conditions in multi-unit residential buildings without mechanical air-conditioning equipment. The project monitoring conducted from the fall of 2003 through the summer of 2004 found that the cross ventilation system had a positive impact on corridor conditions but the full benefit of the system was not being realized due to a controls problem. The controls will be adjusted and the corridor conditions will be monitored for a period of time in the summer of 2005.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 22710200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ESTABLISHING PERIODS OF LOW NATURAL VENTILATION

This research project will use historical data collected in Ottawa by NRC to roughly establish these periods of low natural ventilation - when stack and wind pressures are so low that natural ventilation does not occur. There are generally two types of ventilation in houses: natural infiltration (and exfiltration) produced by stack and wind pressures, and mechanical ventilation by exhaust or intake fans operating across the house envelope. Natural infiltration is variable. There are periods during the year when outside temperatures are moderate and windspeeds so low that there is little or no natural ventilation produced. The mechanical ventilation systems are particularly essential during these periods. It will then use modelling and weather data to extend the analysis to other locations in Canada. The work will be completed by fall 2005.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 32140200
Division : Policy and Research Division — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

FEASIBILITY OF SOLAR WATER HEATING SYSTEMS FOR COMBINED DOMESTIC WATER AND SPACE HEATING

The goal of the project is to analyze solar water heating installations in single family residences, to determine the solar energy usage and related life cycle costing, as well as the overall system effectiveness. The objectives of the research are to:

1. Determine solar thermal energy usage and related costing for solar water heating systems;
2. Perform a life cycle costing analysis on solar water heating systems, in comparison to conventional means of heating for domestic hot water (DWH) and space, and to solar water heating for DWH only;
3. Document the effectiveness of solar water heating systems, using factors such as design, installation and maintenance issues, system efficiencies, and occupants' feedback; and
4. Determine the ability for this technology to be used more widely in Canada.

A final report is expected in spring 2006.

CMHC Project Officer : *Thomas Green* — ***CIDN*** : 28370208
Division : External Research Program — ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available — ***NEW***

FIELD TRIALS OF THE EKOCOMFORT PRODUCTS

CMHC, in partnership with NRCan, carried out a project to evaluate the performance of a new residential HVAC system that combines space heating, domestic hot water and ventilation into one integrated unit. These products, being produced under the eKOCOMFORT label, were developed by several independent Canadian manufacturers in partnership with NRCan. The detailed monitoring of the performance of each of the manufacturers eKOCOMFORT units was carried out in homes in different regions of the country to assist each manufacturer in refining their products. The project also assessed the ease or difficulty of installing and commissioning the units in a variety of residential situations, information designed to assist manufacturers to refine and improve product installation. In addition to fully monitored sites, audits were carried out on eKOCOMFORT units of each manufacturer to collect and evaluate homeowner/user data on maintenance, operating cost, noise levels and customer satisfaction. The field work for this project was completed in August 2004, with the project report to be available in the summer of 2005.

CMHC Project Officer : *William Semple*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 27820200

STATUS : Ongoing

STUDY OF NECESSARY CHANGES TO HARMONIZE STANDARDS REQUIREMENTS RELATED TO COMBUSTION VENTING

In the recent review of ventilation codes and standards, it became clear that standards from different agencies use disparate means of assessing whether a house chimney or vent is at risk. A contractor examined the requirements from each standard and drafted appropriate code language to present to those committees. These changes were presented to the CSA F326 committee in January 2003. A task group presented the CSA F326 preferred protocol to the standards committees for the gas, oil, and wood industries through the spring and summer of 2003, in hopes of harmonizing the requirements for all these standards. The gas and oil standards committees have created task groups to study the harmonization proposals. The wood industries standard is in line with F326. Hamonization efforts will continue through 2005 and beyond.

STATUS : Completed

AVAILABILITY : There will be no product for this project

TUNE-UP GUIDE FOR MULTI-UNIT RESIDENTIAL BUILDINGS

A guide has been developed that compiles existing information on how on-site staff and contractors can improve, or fine tune, the performance of multi-unit residential buildings. Similar guidelines exist for commercial buildings but are referred to as re-commissioning guidelines. The guide will provide low cost and no cost methods to improve the performance of building envelope, space and domestic hot water heating, ventilation, health and safety, and electrical systems and appliances in multi-unit residential buildings. While the energy savings accrued are expected to be modest, use of the guide will ensure that buildings operate efficiently and performance problems are resolved before they become larger concerns. The Tune-Up guidelines will also allow a property owner or manager to establish optimal system conditions so that the impact of repairs, renovations, or energy and water efficiency improvements can be realistically evaluated. The Guide was completed in March 2003. A Research Highlight describing the Tune-Up Guidelines will be released by July 2005. CMHC field testing of the Guidelines in Toronto and Saskatoon began in September 2003 but delays in implementation in both cities will lengthen the post implementation periods to March 2006 for Saskatoon and possibly December 2006 for the Toronto projects.

CMHC Project Officer : *Duncan Hill*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 23590200

STATUS : Ongoing

BEST PRACTICE GUIDES UPDATE

This project will revise, one at a time, the five existing Best Practice Guides, starting with Brick Veneer Steel Stud published five years ago. New research and user feedback from seminars based on the guides and from CMHC's web site indicate that some text and details need updating. Partnerships will be developed with interested parties for input, review and promotion. A national competition will be held to select a consultant for each guide who will be responsible for coordinating and producing the revision work. Each consultant will work with an advisory committee, specific to each guide, who will participate in drafting the new edition. The advisory committee will include practitioners, industry representatives, manufacturers and regulators. The work will include a thorough study of the existing Guide, an analysis of users' feedback, and roundtable critique sessions. Public sessions will be held to discuss the proposed revisions. The consultant will then collect the information, produce the revised manuscript and obtain consensus from the advisory committee. The revised Brick Veneer Steel Stud guide is currently being reviewed by the advisory committee, and will be complete by the autumn of 2005.

CMHC Project Officer : *Barry Craig*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 23780200
STATUS : Ongoing

BETTER BUILDINGS CASE STUDIES

This project documents and illustrates repairs and upgrades to multi-unit residential buildings across Canada. It is estimated that, in this country, $300 M are spent every year in premature building failures. CMHC is collecting and publishing easy to read case studies to present to owners, architects, builders and property managers on what can go wrong and why, how to fix it and how much it will cost. Most cases will focus on the building envelope since the vast majority of documented problems occur there, in addition to examples of energy and acoustical upgrades. This project adds to CMHC's current documentation and publication of case studies on repair and retrofit of multiple-unit residential buildings. Ultimately, a repair guide will be developed based on this work. Case studies from across Canada are obtained from those directly involved in the repairs and involve buildings of all types of construction ranging in height from 3 to 50 storeys. Every year the Corporation publishes 10 Better Buildings Case Studies on CMHC's website: http://cmhc.ca/en/imquaf/himu/bebufa_021.cfm. To date, 48 case studies have been published.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is available on the web

CIDN : N/A
STATUS : Ongoing

BUILDING ENVELOPE TEST HUT FACILITY PHASE 2 FEASIBILITY STUDY

CMHC, in partnership with the Homeowner Protection Office and Forintek Canada Corporation, provided the British Columbia Institute of Technology (BCIT) with a financial contribution to undertake and complete a study to assess and evaluate the feasibility of building, operating and maintaining a Building Envelope Test facility in which the response of wall assemblies to 'real-time' weather load, as experienced in the coastal climate of British Columbia, can be investigated and evaluated. The project is expected to be completed by the end of 2005.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 23840200
STATUS : Ongoing

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project reviewed Statistics Canada data files to estimate the number of condominiums in Canada, their location, age, number of storeys and number of suites based on the number of building permits issued since 1970. Using STATSCAN data, it was concluded that approximately 6,000 condominium buildings exist in Canada. Based on discussions with the Canadian Condominium Institute and other agencies, this estimate likely understates the number of buildings. The review also found that buildings could not be classified by the number of storeys nor number of units using STATSCAN data. Based on the outcome of this project, CMHC initiated another project with the University of Ottawa to review the data available on condominiums within municipal files. The project revealed that the data exists within the local land registry office but was difficult to extract given the state of the individual files. Nevertheless, the University of Ottawa was able to characterize the population of condominiums in the greater Ottawa area in terms of number of buildings, number of units, number of storeys and age. A report and Research Highlight documenting the project findings are available: "Characterizing the Condominium Population of the Greater Ottawa Area, 1969 - 2002". CMHC is currently repeating the project in Halifax, Nova Scotia, to determine whether or not similar opportunities to characterize the stock of condominiums exist elsewhere. This project has been completed and the report will be available by July 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 2277 0200001-2
STATUS : Ongoing

ENGINEERED BUILDING ENVELOPE SYSTEMS FOR OUTDOOR/INDOOR CLIMATE EXTREMES

CMHC is contributing to a National Research Council project to identify indoor conditions and weather in northern and northern-coastal communities, and select appropriate building envelope assemblies for extreme climates. The project will assess the hygrothermal performance of these assemblies by computational and laboratory testing, measure air leakage by means of blower door tests and produce performance parameters for heating and high humidity climates. The project will also analyse the energy and environmental impact of proposed building envelope assemblies. The research findings will be published in a research report, and presented in seminars throughout Canada and the North. The project began in the winter of 2004 and a final report will be produced by the spring of 2008.

CMHC Project Officer : *Barry Craig*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 29600200
STATUS : Ongoing
NEW

EVALUATION OF BUILDING CONDITION ASSESSMENTS REPORTS

This project will review building condition assessment reports of twenty-five high-rise (over eight storeys) residential buildings to illustrate general trends and formats in use. A building condition assessment is a review and comment on the present and anticipated condition and performance of a building's components. Various elements of the property can be included in the review (architectural, mechanical, electrical, civil, elevating devices, building envelopes, underground parking structures, recreational facilities and other specialty construction). Property managers report that the quality of the condition reports varies widely and there is no consensus on methodology for the assessment, cost allowances and sources of information on replacement costs and service life of many building elements. This creates financial problems when major items in a building have to be replaced and insufficient or no allowance was made to cover the expense. A sample of the reports will be analyzed in detail to ascertain the validity of the predictions, cost estimates, errors and omissions. A standard building condition assessment form will be developed and tested. Five firms will conduct a condition assessment on the same building using the proposed new form which will then be reviewed by interested stakeholders. Owners, managers, prospective owners and firms conducting audits will benefit from this analysis. The final report is expected in November 2005.

***CMHC Project Officer :** Luis de Miguel*
CIDN : 32260200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

FIELD REVIEW OF INSULATION RETROFITS OF SOLID MASONRY STRUCTURES

This project will investigate the condition of solid masonry wall assemblies that have been retrofitted with interior insulation to reduce energy use and enhance occupant comfort. Site investigations will visually assess the condition of masonry structures and adjacent insulation and framing layers on the exterior and interior of the wall assemblies. This information is required as there is a general perception in the housing industry that the application of interior insulation to solid masonry wall assemblies will cause the walls to deteriorate due to changes in the heat, air and moisture regimes to which the walls are exposed. This work will result in a compilation of case studies of solid masonry insulation retrofit projects and the development of guidelines for assessing and insulating solid masonry buildings. The project will be completed by July 2005.

***CMHC Project Officer :** Duncan Hill*
CIDN : 30840200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

GLASS AND METAL CURTAIN WALLS: BEST PRACTICE GUIDE BUILDING TECHNOLOGY

This manual is an advisory document - a best practice guide to glass and metal curtain wall systems in housing applications. The curtain-wall is a well developed system in commercial applications but it requires special treatment when used in housing. The guide is directed to designers, architects, engineers and manufacturers.

The Guide is organized into nine chapters. Following the introductory chapter, the guide covers: descriptions of curtain wall systems and their components; basic performance aspects of curtain walls; test methods used to evaluate wall performance; CAD details to illustrate special features of curtain walls and explanatory notes to outline the proper use of the details; a discussion of quality assurance along with quality control checklists; an annotated master specification; information related to the maintenance and renewal of curtain wall systems; and a reference section listing useful publications and web sites along with a glossary of curtain wall terminology.

CMHC Project Officer: Luis de Miguel. Ottawa: Canada Mortgage and Housing Corporation; Public Works and Government Services Canada, c2004. 1 loose-leaf binder + 1 CD-ROM

Order number 63702 **Price: $89.00 + GST and handling charges

Nota: Aussi disponible en français sous le titre : Murs-rideaux en verre et métal : guide des règles de l'art technologie du bâtiment

STATUS : New Completed Report
AVAILABILITY : CMHC Information Products

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

Investigations of previously retrofitted solid masonry walls have been performed to determine the impact that the interior application of insulation has on the durability of the walls. The findings of the investigations will be published as case studies. Case studies will include a 120 year old solid masonry building in Montreal that was insulated 15 years ago by the application of spray applied polyurethane insulation on the interior of the walls, a 50 year old solid masonry office building in Ottawa that was insulated on the interior 8 years ago and several 1900's vintage apartment buildings in the Ottawa area. Preliminary indications are that the interior application of insulation has not adversely affected the durability of the masonry walls of the case study buildings but further investigation will be required to confirm that this conclusion generally holds true for other buildings. The case study reports will be available by July 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : N/A
STATUS : Ongoing

IN-SITU MONITORING OF WOOD-FRAMED EXTERIOR WALL SYSTEMS - VANCOUVER, BC

Wood framed buildings in the lower mainland of British Columbia have experienced excessive moisture damage to both sheathings and framing materials. In recent years, with the adoption of Best Practice principles throughout the construction industry (by builders and developers, design professionals and various construction trades) coupled with regulatory amendments to the City of Vancouver building by-laws, a new generation of exterior wall assemblies incorporating a 'rainscreen' moisture management strategy has been constructed. How effective were these walls at managing the exterior moisture loads? The objective of this applied research project, funded by Canada Mortgage and Housing Corporation, is to monitor, assess and document the performance of a residential low-rise four storey, wood-framed building which incorporates rainscreen design technology, and to analyze data to determine the effectiveness of wood frame rainscreen wall assemblies at managing exterior moisture loads. Monitoring of interior, exterior and interstitial wall areas will include temperature, relative humidity, wood moisture content and air pressure differentials. A weather station mounted on the roof of the building will capture the local weather conditions: air temperature and relative humidity, wind speed and direction and rainfall. Monitoring will be carried out for one full year, capturing the wall response to the range of climate loading conditions. Field work is complete and a Research Highlight will be published in 2005.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22540200
STATUS : Ongoing

INNOVATIVE BUILDING CASE STUDIES

Innovative Buildings case studies document new projects of particular interest to architects and other building professionals. They showcase built projects which use new technologies, sustainable features and innovative planning attributes, among other notable features. As they are completed the studies are showcased on the CMHC website at http://www.cmhc-schl.gc.ca/en/imquaf/himu/buin_009.cfm. Soka Bau Green Roof is a new on-line case study. Other products to appear in 2005 include solar housing and ground source heating systems, a "green" residential building in China and the sustainable features of the Bo01 community and housing in Malmo Sweden.

CMHC Project Officer : *Sandra Marshall*
Division : Policy and Research Division
AVAILABILITY : Product is available on the web

CIDN : 08400306
STATUS : Ongoing

LOAD PROFILES IN MULTI-UNIT RESIDENTIAL BUILDINGS: PILOT STUDY ON LOAD PROFILING IN METRO TORONTO HOUSING

This project will describe load profiling work underway in Metro Toronto Housing Corporation multi-unit residential buildings. The project will characterize thermal, electrical power and water requirements in the apartment buildings and will also identify technical issues encountered in load monitoring and data interpretation. This project is being used as a pilot project to identify the factors that will have to be considered in a larger project being planned by CMHC and Natural Resources Canada to assess the energy and water load profiles in low and high-rise housing. The results of the study will be published as a CMHC Research Highlight by summer 2005.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : 22010200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

MODELING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall design and indoor-outdoor environmental conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems. The hygIRC heat, air and moisture model developed by the Institute for Research in Construction is being used to model common wall systems. Retrofits to improve the airtightness and insulation levels in the walls were developed and are being applied to the basic wall systems. The hygIRC model will simulate heat, air and moisture conditions within the retrofitted walls to determine how the retrofits affect the durability of the wall system. This information will be used as a means to confirm the integrity of several specific retrofit measures developed for high-rise wall structures before they are recommended to the building industry. The final project report will be available by August 2005.

CMHC Project Officer : *Duncan Hill* ***CIDN*** : N/A
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

PERFORMANCE EVALUATION OF RETROFITTED SOLID MASONRY EXTERIOR WALLS

Many existing buildings in Canada constructed with solid masonry exterior walls are being renovated and converted from their original commercial or industrial use into residential use. In order to increase energy efficiency and occupant comfort, the addition of thermal insulation is desirable. However, adding thermal insulation along the inside face of the wall is also thought to increase the risk of condensation and frost formation within the wall system during the heating season, as well as to prolong the drying time of the wall. This combination can adversely affect the integrity and durability of the building envelope.

Consequently, unresolved questions remain regarding how to best improve the insulative properties of existing solid masonry walls without compromising their durability. There currently exists no means or guidelines available to accurately predict the performance of walls retrofitted using different retrofit approaches. However, performing a series of condition assessments on existing retrofitted wall systems offers a unique opportunity in helping to create a knowledge base and develop basic design guidelines for future solid masonry wall retrofit projects.

This paper presents the results of the performance evaluations based upon visual reviews and computer aided modelling of a number of buildings with retrofitted solid masonry walls and is intended as an initial step towards helping practitioners elaborate on different retrofit strategies by providing shared knowledge on the historical performance of previously retrofitted solid masonry walls.

Prepared by David Khudaverdian. CMHC Project Officer: William Semple.. Ottawa: Canada Mortgage and Housing Corporation, 2005. (External Research Program Research Report) 79 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_web_may6.pdf

RAIN PENETRATION CONTROL WORKSHOP

Water penetration is a very frequent, recurring problem for building owners, leading to damage of building components, interior finishes and building contents. It frequently leads to high repair costs and possible litigation. Over the past few years, research undertaken by CMHC, has contributed to the understanding and the prevention of rain penetration. In particular the pressure-equalized rainscreen has been applied and refined. In this highly interactive workshop, the causes of rain penetration will be examined. The results of CMHC research will be presented, along with design features and practical details, which will help prevent rain penetration in a variety of wall types. This full day workshop is targeted to architects, engineers, specifiers, builders, developers and building owners concerned about rain penetration and how to prevent it. The workshop was presented in Toronto, Winnipeg, Edmonton, Montreal and Vancouver. No presentations are planned in the near future. This workshop was developed in cooperation with the Canadian Masonry Association, the Canadian Precast Concrete Institute and the Exterior Insulated Finish Systems (EIFS) and curtain wall manufacturers.

CMHC Project Officer *: Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Seminar/training is available

CIDN : 08380303
STATUS : Ongoing

RETROFITTING BOILER PLANTS USING FAN-ASSISTED RADIAL COPPER-TUBE BOILERS

The purpose of this study is to examine the factors to be considered when replacing boilers in existing boiler plants with new fan-assisted radial-fired copper-tube (FARC) boilers.

FARC boilers are popular for retrofit work. They are more efficient than atmospheric boilers, and are smaller, and lighter than other boilers of similar efficiency, making them ideal as replacement boilers where access or weight is an issue. The low mass nature of these boilers, however, has an impact on their application. The proper flow, and consequently the water temperature rise (DT), through these boilers is critical and must be maintained within narrow limits. Too little flow could overheat the heat exchanger and shorten its life. Too high a flow can scrub the heat exchanger tubes, cause pitting and early failure. The head or water pressure drop through the boiler is also much higher than other boiler types, requiring special attention to the pumping.

This study examines 4 boiler plants with different piping configurations to determine the changes, if any, required to the piping and pumping to accommodate the installation of fan-assisted copper-tube (FARC) boilers.

Prepared by Weinstein Taylor & Associates. CMHC Project Officer: William Semple. Ottawa: Canada Mortgage and Housing Corporation, 2005. (External Research Program Research Report) 45 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC_Retrofit_Boiler(w).pdf

REVISIONS TO BRICK VENEER STEEL STUD BEST PRACTICE GUIDE

The objective of this project is to produce a revised version of CMHC's Brick Veneer Steel Stud Best Practice Guide, published in 1996. New research and user feedback from seminars based on the guides and from CMHC's web site indicate that some details need updating. Partnerships have been developed with interested parties for input, review and promotion. A national competition was held to select the consultant responsible for co-ordinating and producing the revision work. The consultant, Jim Posey, is working with an advisory committee, specific to the BVSS guide, which participates in drafting the new edition. The advisory committee includes practitioners, industry representatives, manufacturers and regulators. The work has commenced with a thorough study of the existing Brick Veneer Steel Stud Guide, including an analysis of users' feedback, followed by roundtable critique sessions. Public sessions were held to discuss the proposed revisions. The consultant then collected the information, produced the revised manuscript and is now in the process of obtaining consensus from the advisory committee. Revisions to the text and details are with the advisory committee for their comments.

CMHC Project Officer : *Barry Craig*	***CIDN*** : 23780200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

SUITABLE ACOUSTIC AND FIRESTOP TECHNOLOGIES

The objective of this research is to develop a Best Practice Guide containing technical solutions for noise control and fire prevention that have been validated by a systematic review process. Although fire resistance and sound transmission ratings are available for a broad range of generic wall and floor assemblies, the building industry needs recognized solutions to ensure satisfactory performance in complete buildings. Accepted practice in one jurisdiction may be unacceptable in neighbouring provinces, or even in other cities in the same province. Designers, plan reviewers, builders, and inspectors, will benefit from a credible and broadly accepted set of solutions for appropriate sound and fire control with firestopping. Designs will be approved by a steering committee including partners from NRC, municipal governments and industry, and advisors from US and Canadian standards agencies. The guide will include details of firestops at service penetrations, barriers to restrict fire spread in concealed spaces, control of noise from plumbing and acoustic leaks at service penetrations. The project began in the autumn of 2004 and will be completed in 2005.

CMHC Project Officer : *Barry Craig*	***CIDN*** : 32190200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

SUPPORT FOR THE 10TH BUILDING SCIENCE AND TECHNOLOGY CONFERENCE, OTTAWA, MAY 2005

In recognition of the role that the Canadian Conferences on Building Science and Technology have played in the dissemination of technical housing research, the promotion of sharing and discussion of knowledge and experiences by the building science community and the importance of a Canadian forum for building science issues, CMHC joined the Institute for Research in Construction of the National Research Council, Natural Resources Canada and other public and private sector agencies as a major sponsor of the 10th Canadian Conference on Building Science and Technology, Ottawa, Ontario, May 12-13, 2005.

CMHC Project Officer : *Duncan Hill*	***CIDN*** : 32230200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

SUSTAINABLE BEST PRACTICE DETAILS

This project will produce a short, general guide to sustainability in residential construction that would apply as a companion piece to all CMHC Best Practice Guides. Existing details in the Brick Veneer Steel Stud Best Practice Guide will be examined and alternative details will be drawn. The new details will introduce concepts of sustainability and green materials to promote a healthier and durable environment. An important part of this project will be a method to compare alternatives when selecting materials. This Guide will assist architects and designers to resolve durability and sustainable design issues. The final report is expected in 2005. The Guide should be available by mid 2006.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30480200
STATUS : Ongoing

WORKSHOP ON WOOD CONSTRUCTION DETAILING

This project resulted in a one-day workshop on wood-frame detailing for new buildings, addressed to architects, engineers and designers, with a focus on durability, buildability, acoustic performance and fire safety, based on various CMHC publications. The workshop is modelled after others CMHC has presented across Canada. After a brief introduction on Building Science, participants are presented with actual construction details which they analyze for air barrier and thermal continuity, condensation and rain penetration control. Subsequently, they re-design the details to optimize performance. The afternoon session deals with fire and sound issues in a similar manner. Registration is limited to 52 participants who work individually and in groups of 13. The workshop has been presented in Toronto and Ottawa, in collaboration with the Ontario Association of Architects, and also in Edmonton and Calgary in collaboration with the Alberta Building Envelope Council. No other presentations are planned at this time.

CMHC Project Officer : *Luis de Miguel*
Division : Policy and Research Division
AVAILABILITY : Seminar/training is available
CIDN : 25340200
STATUS : Ongoing

HOUSE CONSTRUCTION

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION - UPDATE

The purpose of this project was to update CMHC's Canadian Wood-Frame House Construction guide to reflect the changes which are to be made to the 2005 edition of the National Building Code of Canada. The CWFHC content was updated to incorporate results from current research and improved housing construction techniques. Proposed changes to the NBC include changes in requirements for stairs, protection from precipitation ingress, carbon monoxide detection, and means of egress from basements. As a result of recent research, additional information was incorporated such as information on proper window installation and site-built roof trusses. The completed research component resulted in new content, sixteen new illustrations, and eighty-five updated/improved illustrations. The updated version is expected to be released in September 2005, at the same time as the 2005 NBC.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 26990200
STATUS : Ongoing

CANADIAN WOOD-FRAME HOUSE CONSTRUCTION TECHNIQUES AND PRACTICES FOR APPLICATION IN OTHER CLIMATES

The purpose of this research project was to demonstrate how to adapt Canadian wood-frame house construction techniques and practices in other countries with different climates. The resulting research report entitled "Durable Wood-frame Construction for All Climatic Zones: A Companion to Canadian Wood-Frame House Construction" is divided into three parts. The first part covers well-established building science principles for building envelope durability. The second part breaks new ground in the development of a series of methods that allows a designer or builder to select a particular wall construction based on local site conditions and climatic data drawn from a NASA weather data base maintained on the world wide web. The third part provides examples of durable wood-frame building assemblies for all climate zones found around the world. The report focuses on the durability of the building envelope, and covers other related aspects of construction (e.g. ventilation and termites). The research is complete and the final report is expected by the end of 2005.

CMHC Project Officer : *Darrel Smith*
CIDN : 27290200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Research highlight is available

CASE STUDY ON THE CARMA CENTRE FOR EXCELLENCE IN HOME BUILDING & LAND DEVELOPMENT

The Case Study on the Carma Centre For Excellence In Home Building and Land Development (Carma Centre) was initiated by the Canada Mortgage and Housing Corporation (CMHC), as a review of the objectives and outcomes of an innovative approach being taken towards solving a growing labour shortage in residential housing.

The Carma Centre's goal is to promote specialized training and define the basic opportunities and occupations in the residential construction and land development industry. The vision of the Carma Centre is to "be the acknowledged Centre for learning and training for the residential construction and land development industry by developing the knowledge and skills base for people and organizations to meet the changing technology, systems and management requirements of the marketplace."

The scope of this case study is the analysis of the Calgary-based Carma Centre. The case study approach has included a literature review, in-depth interviews with individuals directly and indirectly connected with the Carma Centre, on-site interviews with various building trades and suppliers, and focus groups with school and career counselors.

This case study provides an in-depth review of the Carma Centre, their training and awareness initiatives, and their involvement in the Calgary Board of Education's Career Pathways in Professional Home Building. CMHC is interested in examining the Carma Centre's potential, as a particular applied approach, and as a model that could be replicated in other locations across Canada. CMHC is also interested in the Carma Centre's new approach to certification of trades and to professional development within the housing industry. As the Carma Centre uses an industry-driven partnership approach to address skills and labour shortages in Calgary's residential construction industry, this case study is of value to policy makers interested in developing a similar partnership approach.

Prepared by International Results Group. Ottawa: Canada Mortgage and Housing Corporation, 2004. 2 volumes (Volume 1: Main Report; Volume 2: Literature Review)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and for Volume 1:
Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/carmaweb.pdf

Volume 2:
Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/carma.pdf

COMPARING THE PERFORMANCE OF TWO-COAT VS THREE-COAT STUCCO

CMHC supported this Alberta Housing Industry Technical Committee (AHITC) research project. The research used laboratory and field testing to compare the performance of two coat stucco commonly used in the Prairies and standard three coat stucco. If they were to perform similarly, building code changes may be recommended. The laboratory work was not conclusive but two coat stucco did not show the same strength as the code-required three coat. Field tests in Calgary and Edmonton houses showed that both two coat and three coat stucco on new houses were having problems with cracking and serviceability, and that improvements should be made to installation practice. There was an inadequate sample of three-coat stucco houses in the survey to allow a statistically valid comparison between the failure rate of two and three-coat stucco. A Research Highlight, "Assessing the Impact of Thickness on the Performance of Stucco Cladding" was issued in 2004.

STATUS : Completed Research Highlight

AVAILABILITY : No. 04-123 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

DEVELOPING AN INTRODUCTORY COURSE ON WOOD-FRAME HOUSE CONSTRUCTION

The objective of this multipartnered project, which was led by the Homeowner Protection Office, was to develop an introductory course on wood-frame house construction for the owner-builders and small contractors with limited experience in the construction of single detached housing. The course which was designed specifically for B.C. consists of 13 modules and covers legal and regulatory requirements, house construction theory, e.g. building science, house-as-a-system, and information on house construction stages and sequences. The resulting products include a student manual, power point presentation and instructor's notes, and an exam. The course will be piloted several times over the next year in a number of locations in BC. Following the pilots, the course may be revised to accommodate any necessary corrections or improvements. CMHC will then consider the merits of "nationalizing" the course for use in other regions of Canada. Partners included the Homeowner Protection Office, the Canadian Home Builders Association of B.C., the Building Officials Association of B.C. and CMHC.

CMHC Project Officer : *Darrel Smith*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 28820200

STATUS : Ongoing

SEISMIC PERFORMANCE OF WOOD-FRAME HOUSING - EARTHQUAKE 99 DATA ANALYSIS

This project will allow for researchers at University of British Columbia to analyze an enormous amount of data generated by the multi-year EARTHQUAKE 99 Project (a collaborative effort between TGB Seismic Consultants and University of British Columbia). The results of the research will be reported on and then disseminated to the various housing stakeholders for review and comments, increasing awareness and knowledge of the risks associated with the performance of current wood-frame construction practices (in consideration of the building codes) when subjected to earthquake loads. The project will be completed by the spring of 2006.

CMHC Project Officer : *Silvio Plescia*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 32330200

STATUS : Ongoing

NEW

SEISMIC UPGRADES TO LOW-RISE HOUSING

This research project proposes to formulate practical applications for the research results of the industry-leading multi-year research project referred to as the Earthquake 99 Project, a collaborative effort between TBG Seismic Consultants Ltd. and the Department of Civil Engineering at the University of British Columbia. The objective of this project is to formulate options for improving the earthquake preparedness of residential wood frame housing in British Columbia. Both new and existing single family and multi-unit wood frame construction will be investigated. To set the context for the examination of improvements in earthquake preparedness through seismic upgrading, this project will first examine the different types of housing construction commonly found in British Columbia. Design earthquakes and soil amplification for the south-west corner of the province will be examined as a precursor to the detailed evaluation of the earthquake damage potential for the range of housing types. This project is expected to be completed by end of 2005.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25380200
STATUS : Ongoing

SEMINAR ON THE PROPER INSTALLATION OF WOOD I-JOISTS

This project will develop training material, e.g. trainer's manual and visual aids, validated through a pilot, for a one day seminar on the proper installation of wood I-joist floor systems. Most of the material will be based on the "Installation Guide for Residential Wood I-Joist Floor Systems" but it will be expanded to cover the actual installation process. The guide, and its accompanying pocket guide, will serve as the participants' handout and resource material. The seminar will be delivered by the APA The Engineered Wood Association. Other delivery means may be explored as well. The seminar will be targeted to builders, renovators and building officials and the affected trades who work with wood I-joists. The seminar will be ready for delivery in 2006.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Seminar/training is not yet available

CIDN : 32220200
STATUS : Ongoing

HOUSE CONSTRUCTION INDUSTRY

CARMA CENTRE RESIDENTIAL CONSTRUCTION TRADES TRAINING: JOB FUNCTION AND CURRICULUM VALIDATION

This project addresses a component of an overall project entitled "Career Pathways in Professional Homebuilding". The objectives of this project were to complete validation of 100 occupations and develop potential career ladder and pathways and counselling documents to be used by students and adults, counsellors and educators. The research was necessary to evaluate job functions of all the major occupations and to determine the skills and technologies used to perform each job function. This job function information was evaluated against existing curriculum in both the high schools and post secondary institutions. This process will assist in updating and re-writing curriculum to match industry practices and worker needs. The project was completed in spring of 2005 with a report to be available in summer 2005.

CMHC Project Officer : *William Semple*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28810200
STATUS : Ongoing

HOUSE CONSTRUCTION INDUSTRY

TRAIN THE TRAINERS WORKSHOP - PILOT

The objective of this project was to develop and pilot a generic 3 day train-the-trainer workshop for builders and renovators, First Nations technical service providers, and private home inspectors so they could become trainers for their jurisdiction and membership. Topics included: How Adults Learn, Roles of a Facilitator, Teaching Methods, Presentation Techniques, and How to Use Audio Visual Equipment. The workshop was designed on interactive adult training principles and provided participants with opportunities to practice delivering training material. Two pilots were held with a total of 35 participants from across the country. The final deliverables which include a Participant's Manual, Facilitator's Manual and a Quick Reference Guide will be published and made available to interested groups upon request.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32200200
STATUS : Ongoing

HOUSING RESEARCH

CONTRIBUTION TO RESEARCH PROJECTS AT THE CANADIAN CENTRE FOR HOUSING TECHNOLOGY

In co-operation with NRC and NRCan, this project is to support research projects to evaluate energy efficiency technologies, and data analysis of house performance at the Canadian Centre for Housing Technologies (CCHT). Led by NRCan, the first residential fuel cell installation is currently being evaluated as part of this project at the CCHT. Several other projects will be determined by the CCHT's Research Committee which represents the three partners, Canada Mortgage and Housing Corporation, Natural Resources Canada and the National Research Council of Canada.

CMHC Project Officer : *Ken Ruest*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32090200
STATUS : Ongoing

INDOOR ENVIRONMENT

COMBUSTION APPLIANCE VENTING LIMITS: LAB TESTING AND STANDARD DEVELOPMENT

This project will quantify spillage levels of different gas appliances under high levels of depressurization. In parallel, test methods will be developed and recommended to the appliance standards so that depressurization testing can be integrated into their certification testing. This work follows from a recent CMHC survey of in-use appliance spillage. If successful, the testing will quantify the amount of combustion spillage of appliances under depressurization and help to assess the health implications of that spillage. Depressurization test methods will be developed for standards agencies. The laboratory work will be undertaken in conjunction with Natural Resources Canada and completion is expected by mid 2006. The procedure will be forwarded to the gas appliance standards agencies, and may perhaps be applicable for oil appliance standards as well.

CMHC Project Officer : *Don Fugler*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32130200
STATUS : Ongoing

COMPREHENSIVE PARTICULATE REDUCTION FOR HOUSE OCCUPANTS WITH RESPIRATORY PROBLEMS

High levels of airborne particulates are associated with decreased lung function and increases in hospital visits and mortality, particularly in those people with pre-existing respiratory problems (e.g. asthma). Many recommendations by health professionals stress actions to reduce the amount of indoor particulate. This study attempted to quantify the amount of indoor particulate in a small sample of houses and test the success of measures to reduce indoor particulate concentrations. Field work is complete and a final report has been drafted. Internal sources contributed strongly to indoor particulate and were the most difficult to remediate. While the project will help in the understanding of indoor particulate in Canadian houses, indoor concentrations and the effects of remedial measures on particulate levels cannot be consistently predicted. A Research Highlight will be available summer 2005.

CMHC Project Officer : *Don Fugler*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 30490200

STATUS : Ongoing

DEPRESSURIZATION RESISTANCE TESTING

There were two projects under this title. One project supported the development of testing procedures to be used in wood burning appliance standards to determine the depressurization resistance of various appliances. The lab testing procedure was more complicated than originally envisioned. The test protocol had difficulty dealing with appliances (such as woodstoves) that had a variable output and a cycle measured in hours. It may be appropriate for appliances with more consistent performance, such as pellet stoves or fossil fuel fired appliances. There is no published report. Another project surveyed 100 appliances in Peterborough to see if theoretically "spillage-resistant" appliances can operate under significant house depressurization. Many of the spillage-resistant appliances can operate safely at up to 50 Pa of negative pressure, but there are examples in every class of product which spill despite their apparent "spillage resistance". A Research Highlight has been produced (04-121 in the Research Highlights Technical Series). The project results are part of the justification for the new laboratory test project on the pressure limits of spillage resistant appliances.

STATUS : New Completed Research Highlight

AVAILABILITY : Note: No. 04-121 in the Research Highlights Technical Series summarizes the results of this research and is available on the CMHC web site.

FEASIBILITY STUDY FOR INVESTIGATING THE RELATIONSHIP BETWEEN INDOOR AIR QUALITY AND SEVERE RESPIRATORY TRACT INFECTIONS IN INUIT INFANTS IN BAFFIN REGION, NUNAVUT

CMHC made a contribution to a feasibility study investigating the relationship between indoor air quality and severe respiratory tract infections in Inuit infants in Baffin region, Nunavut. The work was carried out in conjunction with the Children's Hospital of Eastern Ontario, Health Canada, Natural Resources Canada, the Nunavut government and Nunavut health and housing agencies. Testing took place over the winter of 2003 in 20 houses in Cape Dorset, including air quality measurements, blower door testing, and long term air change rate measurement. These results show that some of the houses are under ventilated, but that air quality is similar in many aspects to more southern housing. A follow-up project with the partners is exploring ventilation solutions in Nunavut communities in 2005. The first step, in progress, is surveying air change rates and occupancy factors in 100 houses in four Nunavut communities, to see if the Cape Dorset results are typical. If low ventilation rates are confirmed as a significant factor in this larger sample, the next year of work will explore ventilation solutions for northern housing.

CMHC Project Officer : *Don Fugler*

Division : Policy and Research Division

AVAILABILITY : Product is not yet available

CIDN : 27570200

STATUS : Ongoing

LET'S CLEAR THE AIR INDOOR AIR QUALITY (IAQ) INITIATIVE

This initiative delivers information on indoor air quality in the home to targeted audiences, the end result of which will benefit Canadian homeowners and occupants. Basic information to increase awareness and appreciation of indoor air problems is through the one-day Let's Clear the Air seminar (for housing and health professionals) or the Build and Renovate to Avoid Mold workshop (for builders, renovators, architects, real estate and insurance appraisers). A second day consisting of a site visit to a home with an IAQ expert demonstrates the IAQ investigation method. Qualified individuals can proceed to the CMHC Residential Indoor Air Quality Investigator Training Program. Individuals who complete the training program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. As a private business, they offer their professional services to the public for a fee. Individuals interested in the program can contact Virginia Salares (e-mail vsalares@cmhc.ca, tel 613 748-2032, fax 613 748-2402), the training coordinator (e-mail: iaq22qai@magma.ca, telephone 819 827-3915) for admission requirements and application forms. For referral purposes, a list of diploma graduates is available from CMHC offices.

CMHC Project Officer : *Virginia R Salares*
CIDN : 16230300
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Seminar/training is available

PEI STUDY: HOUSING CONDITIONS, BIOLOGICAL EXPOSURE AND CORRELATIONS TO HEALTH OF BABIES IN PEI

This project, funded by Health Canada, consists of repeating the air quality tests in some houses from the PEI study called: Housing Conditions, Biological Exposure and Correlations to Health of Babies in PEI. The purpose of the project is to verify if the exposure conditions measured at the beginning of the babies' health monitoring is representative of the exposure during the full two years of the health monitoring. In the fourth year of the study, 33 houses had repeat testing performed--floor dust sampling only. During the fifth year of the study, the complete testing protocol was repeated in 6 houses. During the winter of 2002/2003, 10 additional houses have been retested. No further retesting is planned and the babies health monitoring is now complete. Data analysis is underway.

CMHC Project Officer : *Ken Ruest*
CIDN : 16180300
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : There will be no product for this project

RENOVATING THE HOME FOR ASTHMA: AN INTERVENTION STUDY

The purpose of this project is to study the relationship between air quality in housing and respiratory health. Health Canada, Carleton University and Natural Resources Canada are partners and are represented in the project advisory committee. Funding is from CMHC, with contribution from the Program for Energy Research and Development (PERD). The methodology is similar to that of a completed pilot project which studied the effect of renovating the homes for indoor air quality on the asthmatic condition of the occupants. This project will look at 20 case studies of moldy houses selected from different parts of the country and renovated by their owners. Remediation of the houses will incorporate measures to improve their energy efficiency. The output will be a research report that will be of interest to builders and renovators, the general public, the asthmatic population, researchers and physicians. The study is ongoing and expected to be completed in 2005.

CMHC Project Officer : *Virginia R Salares*
CIDN : 2157 0200001
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by the Natural Sciences and Engineering Research Council (NSERC), Paracel Laboratories, Morrison Hershfield Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is underway.

CMHC Project Officer : *Virginia R Salares*
CIDN : N/A
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

RESIDENTIAL MARIJUANA GROWING OPERATIONS AND CLANDESTINE NARCOTICS LABORATORIES - HEALTH AND SAFETY ISSUES FOR CONSUMERS AND IMPLICATIONS FOR CMHC

In partnership with the RCMP and the CSA (Canadian Standards Association), CMHC is undertaking a study of the extent of damage and contamination due to mold or chemicals in houses that have been used for growing marijuana. A first phase study of ten grow houses has shown the lack of uniformity and unnecessary costs involved in the methods of assessment that are presently employed and that damage to the houses from neglect or disconnection of hydro can be more serious than from the growing operation. Further research to ensure that Canadians buying homes previously used to grow marijuana are protected has been identified. There is also a need for a standardized protocol for assessing grow houses and a method to ensure that proper remediation is carried out. The results, to be available in late 2005, are anticipated to be used by external organizations.

CMHC Project Officer : *Virginia R Salares*
CIDN : 32180200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

YEARLY VARIATION IN BIOLOGICAL CONTAMINANTS

Ten houses that have previously been characterized for biological contaminants during the winter have been retested a year later to determine the variability of microbiological markers. The data is being analyzed to identify climatic and other factors that may affect year to year measures of biological contaminants in houses. The validity of "one point in time" testing to characterize multi-year biological contaminant loads in houses during the winter will be assessed. This project will increase knowledge of yearly winter variations in microbiological loads in houses, and of testing procedures that provide the most repeatable long term building microbiological markers. One potential outcome would be the confirmation that CMHC's methodology of assessing IAQ problems by inspection alone is still the most accurate assessment of biological contamination without expensive testing or lab analysis. This may also indicate which testing methodology represents the most stable indicator of long term biological indicators in houses. The results will be available in the summer of 2005.

CMHC Project Officer : *Ken Ruest*
CIDN : 32160200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF DRIVING RAIN MAPS AND LOADS FOR CANADA

The objective of this External Research project is to develop maps of Canada and nomographs that quantify the driving rain load for different types of buildings across Canada. More specifically, the research will (1) extend and document existing driving rain prediction methodologies, (2) collect, analyze and interpret hourly driving rain information as it relates to building enclosure performance, (3) create climate maps and tables that are as useful for the design of building enclosures as current structural load maps and tables are for the design of structural members, and (4) generate a range of statistics and correlations that improve our understanding of the driving rain load and its variation with climate. This project is expected to be completed by fall of 2005.

CMHC Project Officer : *Silvio Plescia* **CIDN** : 26470207
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

HOW IMPORTANT ARE DEHUMIDIFIERS IN PREVENTING MOLD IN HOUSES?

This study will test the effectiveness of dehumidifiers in managing relative humitidy in basements. Measurements of relative humidity and moisture readings of selected surfaces will be taken in fifteen houses of varying ages and characteristics in two climate zones over a two month period in the summer and early fall during periods when a dehumidifier is running and when it is turned off. A pilot study of three matched houses in the same area was conducted in the fall of 2004. The larger study involving a larger number of houses in different regions is planned for 2005.

CMHC Project Officer : *Virginia R Salares* **CIDN** : 32170200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

ICE DAMMING PHOTOS

It is possible that the patterns of ice or snow on residential roofs may be useful in predicting the house tendency to ice damming, or in the locating of the trouble spots. The goal of this project was to photograph roofs of houses in Winnipeg, Toronto, and Peterborough during periods of heavy frost or light snow, and to show the specific roof 'hot spots' or places with preferential melting. The photos taken in the three cities show that there are many houses with differential melting patterns on their roofs. Follow-up photos taken in the snowy winter of 2003/04 in Winnipeg show that ice damming frequently occurs in the vicinity of the areas of high roof melt. The converse situation, does a house without melt patterns avoid ice damming, was not investigated adequately enough to prove the hypothesis. More research is required to confirm the test technique. A research highlight (Technical Series 04-119) has been published "Diagnosing Attic Performance by Snow- and Frost-Melt Patterns" .

CMHC Project Officer : *Don Fugler* **CIDN** : 21420200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Research Highlight is available

INVESTIGATE THE INCIDENCE OF PLUMBING RELATED WATER LEAKAGE IN HOUSES

Recent research on molds in houses has indicated a high incidence of reported plumbing related wetting incidents in houses. This study is to investigate the nature of the plumbing incidents that cause moisture problems. Results from this investigation will provide guidance to implement measures required to minimize plumbing related wetting incidents in houses. A research consultant will be selected in mid 2005 and the study report will be available by late 2005.

CMHC Project Officer : *Ken Ruest* **CIDN** : 30880200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MODIFY AND UPGRADE WALLDRY COMPUTER PROGRAM

The objective of this project is to modify and upgrade WALLDRY, a computer program developed by CMHC, which models the flows of moisture, heat and air through wall assemblies in response to given external climatic loads and interior temperature and humidity conditions. Project completion is expected by the summer 2005.

CMHC Project Officer : *Silvio Plescia* **CIDN** : 25050200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

MOISTURE PROBLEMS IN SEASONALLY OCCUPIED HOUSING

This research will examine moisture issues of unoccupied houses. There are many dwelling types that do not have occupants for long periods of time. These would include houses where the homeowners go south for a large part of the winter, second houses, houses deserted for periods due to natural disasters, rental houses without occupants for extended periods, and cottages. Unoccupied houses often suffer moisture related damages to building materials, finishes, and house contents. In many cases, there should be simple ventilation solutions that will reduce or eliminate these moisture problems. This project will investigate the types of moisture problems found. The Nova Scotia contractor will analyze moisture sources and removal methods, and then recommend solutions for a variety of sample dwellings. The solutions will depend on whether the unoccupied spaces have electrical power, and functioning heating or ventilation systems. The research will take two full winter seasons and is planned to be complete in 2005. Initial findings suggest that many of the moisture-troubled houses have familiar foundation problems that require traditional repairs.

CMHC Project Officer : *Don Fugler* **CIDN** : 27070200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

POTENTIAL FOR MOISTURE PROBLEMS DUE TO PLASTIC SHEETING IN WALL ASSEMBLIES

This project will examine whether plastic air-vapour barriers currently used in Canadian wall assemblies are an asset or a problem. There has been significant criticism recently of the use of plastic in above-grade and basement wall assemblies, in that plastic limits the ability of the wall to dry into the house, and that it provides a condensing plane for water vapour driven into the wall when the sun heats the exterior sheathing. The research will assess the criticisms levelled against plastic sheeting and will compare the use of plastic to other alternatives, using hygrothermal modelling. Field testing in new houses and with test huts will be used to confirm the predicted effects. Testing will take place in basement and above-grade walls. The work is to be completed by fall of 2006.

CMHC Project Officer : *Don Fugler* **CIDN** : 32150200

Division : Policy and Research Division ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

TESTING THE EFFECTIVENESS OF CLEANING TO REDUCE EXPOSURES OF OCCUPANTS TO MOLD

This study proposes to test the effectiveness of thorough and regular routine cleaning of moldy houses in reducing occupant's exposure to mold. The pilot phase of the study on two houses was completed in 2004. A second pilot on six homes to establish the cleaning procedure is underway in 2005. The results of the pilot will be used to develop the methodology (cleaning procedure, frequency of cleaning, field measurements) to be used on a larger number of houses for the next phase.

CMHC Project Officer : *Virginia R Salares*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24480200
STATUS : Ongoing
NEW

WATER PENETRATION TESTING ON WALL SYSTEMS

There is an overall lack of good, qualitative data to compare the drainage characteristics of various claddings, drainage cavity configurations and building materials in wall assemblies. In some jurisdictions across Canada, rainscreen or cavity wall construction will be required (mandated) to manage the expected exterior moisture loads; the City of Vancouver Building By-laws have already mandated the use of rainscreen wall systems. Many new products have been introduced into the marketplace in recent years, which claim to promote and/or improve drainage characteristics and drainage performance of wall systems. However, the actual performance of these products has not been fully evaluated or understood. The objective of this project is to perform laboratory tests to investigate how effectively different drainage cavity configurations (including wall assemblies with proprietary drainage media) are able to drain water or retain water within the cavity space. The study will also investigate where in the wall assembly the moisture is entrapped and how long the wall assembly will dry out (under isothermal conditions). This project is expected to be completed by the summer of 2005.

CMHC Project Officer : *Barry Craig*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25620200
STATUS : Ongoing

WIND-RAIN RELATIONSHIPS IN SOUTH-WESTERN BRITISH COLUMBIA

Moisture is one of the important factors affecting the durability, utility and aesthetics of the building enclosure. Rain, particularly wind-driven rain, is often one of the largest contributors to the overall moisture load the envelope experiences, especially in Canada's coastal regions. The objective of this pilot project will be to analyse climate data for numerous stations in southwestern BC (including Vancouver Island) in order to develop a better understanding of the wind and rain relationships. These include wind speed and direction, with and without coincident periods of rain, and the monthly and seasonal variations in those relationships. The research will relate the weather information (rainfall) to the potential impact on the building enclosure (ie. rain intensity). This project is expected to be completed by the summer of 2005.

CMHC Project Officer : *Silvio Plescia*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30850200
STATUS : Ongoing

NORTHERN HOUSING

GREEN ENERGY FOR REMOTE HOUSING IN THE NORTH

The goal of this sustainable development strategy is broad and involves the evaluation, field-testing, development, demonstration and deployment of fuel cells to meet power and space heating requirements of homes in remote communities of the Canadian North. The main objectives of this project are to assess fuel cell and associated technologies, analyze their feasibility for stationary applications in the Canadian North, and to conduct cost-benefit analysis for producing hydrogen from renewable energy sources.

Different types of fuel cells will be assessed with respect to their applicability to northern communities. Companies developing these will be contacted and some visited. A survey will be sent out to the main fuel cell developers to gain knowledge on their progress, as well as to inform them of this initiative. The project will attempt to determine if fuel cells for stationary purposes are economically feasible for five communities in the north: Inuvik (2001 pop. 2,894), Tuktoyaktuk (930), Sachs Harbour (114), Holman (398), and Paulatuk (286). However, major analysis, conclusions and recommendations will be based on the conditions found in Holman which will be studied for a possible pilot project. A final report is expected by fall 2005.

CMHC Project Officer : *Thomas Green* — ***CIDN*** : 25250216

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

PROPERTY MANAGEMENT

DEVELOPMENT OF AN ENERGY MANAGEMENT PILOT PROGRAM FOR SOCIAL HOUSING IN ONTARIO

CMHC is participating in the development of an Energy Management Program and pilot project for social housing. CMHC will be working with the Social Housing Services Corporation of Ontario to develop an Energy Management Program that will provide local social housing providers with the tools needed to evaluate and implement energy and water efficiency measures in their buildings. CMHC support will be used to develop or adopt tools for the Energy Management Program including utility tracking and on-line energy/water audit facilities, standard energy audits, communication documents for property owners, managers and residents. CMHC will also participate in the evaluation of energy and water efficiency projects in 20 buildings selected to participate in a pilot project to evaluate the costs and benefits of the Energy Management Program. CMHC support will be useful to establish the Program in Ontario and will also provide other provinces with useful information on the development of central energy programs for their social housing stock as well. The project report will be available in 2007.

CMHC Project Officer : *Duncan Hill* — ***CIDN*** : 29820200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

PROPERTY MANAGEMENT

INDOOR AIR QUALITY TROUBLE SHOOTING GUIDE FOR PROPERTY OWNERS AND MANAGERS

A guide for identifying and resolving indoor air quality problems in multi-unit residential buildings will be developed for property owners and managers. The guide will provide instructions for detecting, identifying and resolving common problems relating to the indoor environment in both common areas and individual apartments. Information will also be provided as to when such activities should be referred to an expert. The guide is primarily directed at owners and managers but the information on specific problems and solutions will be presented in such a way that it could be provided to the occupants of individual apartments. The project will be completed in late 2005.

CMHC Project Officer : *Duncan Hill*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 3050-PLN03
STATUS : Ongoing
NEW

RENOVATION AND INSPECTION

CANADIAN HOME INSPECTORS AND BUILDING OFFICIALS NATIONAL INITIATIVE PHASE II

The overall objective of this multiphased Canadian Home Inspector and Building Official (CHIBO) national initiative is to raise the level of competency of the private home inspection industry, the municipal building officials, and the First Nations building officers and establish a qualified and recognizable industry to better serve their clients. Phase I activities resulted in the development of Occupational Standards for each of these sectors. Phase II is now underway which will build on the results of the Phase I to perform a training gap analysis and to develop certification and accreditation models for the inspection industry. The research component is complete with the development of the models and an implementation plan is currently underway. The certification and accreditation models are anticipated to be implemented by the industry sectors later in 2005. Technical Research Highlight 04-112 summarizes the results of this research and is available on the CMHC web site.

CMHC Project Officer : *Darrel Smith*
Division : Policy and Research Division
AVAILABILITY : Research Highlight is available
CIDN : 25150200
STATUS : Ongoing

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

ADVANCEMENT OF COMPETENCY IN INTEGRATED SUSTAINABLE BUILDING DESIGN - SUPPORT OF CONCORDIA UNIVERSITY IN THE 2005 'SOLAR DECATHLON'

In this project, and as one of various contributors, CMHC will support the Canadian team entry led by Concordia University to participate in the 2005 Solar Decathlon in Washington D.C. Based on a preliminary competition, nineteen teams have been selected to participate in this event; the majority of the teams are from the United States, with one each from Canada, Spain and Puerto Rico. The nineteen university teams are to build small solar houses, of about 60 to 70 square metres in size, on the National Mall in front of the Capital Building in October 2005. The objective is to design a completely solar powered house that is self-sustaining for an entire week. Specified requirements include minimum lighting levels, acceptable interior temperature range, water usage and hot water temperature levels. The houses must be able to accommodate normal domestic tasks such as laundry, cooking and showering. CMHC's involvement will include financial and implementation support to the process, technical advice and guidance, and creating and transferring knowledge on

renewable energy based sustainable housing. This project's overall outcomes are:
1) to illustrate how solar energy can improve Canadian's quality of life: solar energy is clean; it significantly reduces pollutant emissions; and solar energy is renewable thereby increasing a nation's energy security.
2) To teach the solar decathletes and the public about how energy is used in their daily lives and to illustrate the energy intensity of various daily activities.
3) To demonstrate that market-ready technologies exist that can meet the energy requirements of our daily activities by tapping into the sun's power.
4) To meet these needs while providing an attractive structure in which to live, work and play.

A related long-term objective of this project is to build enhanced alliances between project partners leading to the capacity development for a future Canadian Solar Decathlon competition.

CMHC *Project Officer* : *Thomas Green*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 32060200
STATUS : Ongoing

ANALYSIS OF RENEWABLE ENERGY POTENTIALS IN THE RESIDENTIAL SECTOR THROUGH HIGH RESOLUTION BUILDING ENERGY SIMULATION

Due to recent advancements in renewable energy technologies such as photovoltaic (PV) and micro-wind turbine systems, the potential for large-scale deployment of such energy sources for a more sustainable society has never been greater. This research will provide a detailed techno-economic assessment of renewable energy potentials in the residential sector through high-resolution building energy simulation using large numbers of representative housing data. The overall objective of the proposed research is to create a tool for potential techno-economic assessment of such technologies to reduce overall energy consumption and its associated green house gas (GHG) emissions in the housing sector. The project entails modelling novel, environmentally-friendly, integrated building energy systems for building applications, and conducting simulation of building integrated renewable energy potential for the Canadian residential sector using advanced building energy simulation software. The final report is expected by the summer of 2006.

CMHC *Project Officer* : *Thomas Green*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 28370205
STATUS : Ongoing
NEW

CANADIAN PASSIVE HOUSE STANDARD FEASIBILITY STUDY

This project is a feasibility study to investigate the European Passive House Standard (and other similar international models such as the net-zero energy design approach) and explore the applicability of this type of housing design standard and information delivery approach to the development of ultra-low energy housing in Canada. The issue of interest is reducing residential energy use and housing related environmental impacts, and contributing to Canada's Kyoto Accord based climate change challenge. The project outcome will be a research report providing an increased understanding about the Passive House Standard and net-zero energy housing approach, including an analysis of technical goals, implementation strategies, degree of success, and how they compare to Canadian residential standards for home energy use and construction. The research has not yet been contracted.

CMHC *Project Officer* : *Thomas Green*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 32050200
STATUS : Ongoing
NEW

CANADIAN SOLAR HOME TOUR IMPLEMENTATION GUIDE

This planned project will study and derive lessons from existing eco-home tour examples and create a generic tour implementation package for use by communities across Canada to host local eco-home tour events. The "how to" eco-home tour guide kit will include information on an analysis of costs and benefits, and will identify recommended key partner organizations, optimal dates, potential lead facilitators, provide generic forms, associated website material and announcements. Hosting an inaugural event in 2006 to test and finalize the package will be part of this project. The project outcomes include increased awareness and understanding of the potential and realized successes of renewable energy and solar applications for sustainable housing. Successful eco-home tour events engage home owners and the interested public in dialogue that can lead to changes in attitude about housing alternatives and lead to changes in behaviour and practice.

CMHC Project Officer : *Thomas Green* ***CIDN*** : 32070200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

CRITERIA AND METHOD FOR EVALUATING SUBDIVISION PLANS FOR LIVABILITY AND SUSTAINABILITY

This project will examine what, if any, criteria are currently used by municipalities to evaluate development plans for livability and sustainability. The project will consist of a literature review and an examination of the criteria and evaluation methods of 10 Canadian municipalities. A Request for Proposal was issued at the end of 2004 and the project will be contracted in spring 2005.

CMHC Project Officer : *Fanis Grammenos* ***CIDN*** : 31710200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPING A FRAMEWORK FOR COSTING GREEN BUILDINGS

Research is about to begin on this project which will document the costs of constructing and operating standard and green buildings. This will be carried out in stages. The first will involve establishing the 'levels' of green building to be used in the study - ranging from a building constructed to the National Building Code, to an Advanced Building performing at a level above an R2000 house. Phase 2 will involve breaking down the cost (per square foot, per unit) of constructing a standard building constructed to meet the requirements of the National Building Code and 'green building'. Phase 3 will include a cost/benefit analysis of each 'green level' in order to provide an overview of the additional costs of each 'green level' of performance. In addition, this will include providing calculations of the projected paybacks of each 'green level' based on projected savings vs. increased capital costs. Both low rise and high rise buildings will be examined. Detailed information on the comparative costs of the construction and operation costs of 'green' vs. standard low rise and high rise residential buildings will be covered.

CMHC Project Officer : *William Semple* ***CIDN*** : 31630200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

DEVELOPING A GREEN RATING SYSTEM FOR RESIDENTIAL BUILDINGS

This project is comprised of three separate but related parts. The first part of the project was carried out to support the research and facilitation of a multi-stakeholder process for the development and implementation of an Action Plan to address the issues surrounding the use and application of LEED for Multi-Unit Residential Buildings (MURB's). The goal of this part of the project was to develop recommendations on i) what issues arising from the use of Green Rating Systems need to be addressed; and ii) how to build support in the private and public sector on the application of Green Rating Systems for MURB projects. Undertaken by the Canada Green Building Council (CaGBC), the funding partners included CMHC, the Greater Vancouver Regional District (GVRD), the CaGBC and NRCan.

The second part of the project involved providing support for the training of the building trades of members of Built Green Alberta through the development of a programme by Southern Alberta Institute of Technology (SAIT) for the Calgary Region Home Builders Association (CRHBA). The goal was to develop a programme for training the construction trades in green building techniques, specifically for the builders taking part in the Built Green Alberta Programme, a programme developed by the Calgary Region Home Builders Association to assist in the delivery of 'green' buildings to the marketplace.

In the third part of the project, CMHC will carry out research to evaluate existing green rating systems for the low-rise residential sector, incorporate the research carried out on the LEED MURB's Task Force (Task 1), and make recommendations for making improvements to existing rating systems or developing a new comprehensive green rating system for residential markets. The first two parts of the project are completed with the third part expected to be contracted late in 2005.

CMHC Project Officer : *William Semple*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32100200
STATUS : Ongoing

NET ZERO ENERGY HOUSING ECONOMIC AND ENVIRONMENTAL VIABILITY STUDY

This project is a partnership between Industry Canada and CMHC, to assess the sustainability implications and enhance knowledge of the potential benefits of Net Zero Energy Housing (NZEH) in Canada. The results of the project will be compiled into a report offering an analysis of the viability, economic and environmental potential of the NZEH concept in five regions across the country. As well, a communication document will be produced that provides a clear understanding of the NZEH concept, highlighting its economic, social and environmental benefits to Canada; opportunities for wider stakeholder engagement; and a visual layout or image of a NZEHome. The final report will be available in summer 2005.

CMHC Project Officer : *Thomas Green*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 29780200
STATUS : Ongoing
NEW

SOUTHFIELD SOLAR HOME MONITORING AND EVALUATION CASE STUDY

This project is a partnership between Natural Resources Canada and Canada Mortgage and Housing Corporation, with the participation of Thomasfield Homes Ltd., and Nexus Solar Corporation. The project will describe the design, and do modelling and monitoring of the Southfield solar EnviroHome in Guelph, Ontario, to indicate the measured energy delivery of each of the Southfield's renewable energy system upgrades as compared to the conventional systems in the Argyle house (next door), and to a hypothetical Southfield house built to OBC standards. The houses are of similar size with similar market features except that the Southfield house incorporates passive solar design, a solar domestic hot water system, and photovoltaic panels, as well as some other advanced energy systems including a demand water heater, and is built to the EnviroHome standard. The project results will provide an understanding of real field results through on-site research/monitoring, and reveal the successes and remaining challenges of incorporating commercially available renewable energy systems into a standard housing development. The study will also create a reporting format for identifying and comparing key features of energy-efficient houses. A final report and CMHC Case Study on the project will be available by summer 2005.

CMHC Project Officer : *Thomas Green* — ***CIDN*** : 29790200

Division : Policy and Research Division — **STATUS** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

SUPPORT TO THE NINTH INTERNATIONAL BUILDING PERFORMANCE SIMULATION ASSOCIATION (IBPSA) CONFERENCE AND EXHIBITION, MONTREAL

CMHC is providing financial support towards the Ninth International Building Performance Simulation Association (IBPSA) Conference and Exhibition which will be held at École Polytechnique de Montréal, August 15-18, 2005. The biannual IBPSA conference incorporates all aspects of modelling and simulation of the built environment including building service systems. Building simulation has the potential to improve the design and operation of buildings. Simulation energy and airflow in buildings is perhaps the best known activity, but simulation of light, smoke, moisture, noise and the quality of the indoor environment is often just as important. Computer simulation can be used to predict future performance at all stages of the building life cycle: design, commissioning, operation and management. Building Simulation 2005 will consist of keynote speeches, presentations of high quality papers, software demonstrations, and plenary sessions, as well as a trade exhibition.

CMHC Project Officer : *Thomas Green* — ***CIDN*** : 29690200

Division : Policy and Research Division — **STATUS** : Ongoing

AVAILABILITY : There will be no product for this project — ***NEW***

TAP THE SUN: REVISION AND UPDATE

This project will revise and update the CMHC "Tap the Sun" publication and accompanying CD-ROM. "Tap the Sun" is a primer on passive solar design, and presents various passive solar techniques and Canadian home designs. The revised "Tap the Sun" product will include important data updates, a wider selection of case study projects, more detailed key resources, and improvements to the integrated tools such as the Comfort Design Checker and the window products design database. As well, the accompanying CD-ROM will include other related software tools such as the RETScreen Solar Heating Module by NRCan. The revised product will be available in 2006.

CMHC Project Officer : *Thomas Green* — ***CIDN*** : 25450200

Division : Policy and Research Division — **STATUS** : Ongoing

AVAILABILITY : Product is not yet available

ENERGY INTENSITY OF CANADIAN WATER SYSTEMS

CMHC in partnership with NRCan, Greater Vancouver Regional District, and B.C. Hydro, is leading a multi-stakeholder study to determine the energy intensity of water systems in Canadian urban centres. The objective will be to quantify the amount of energy used within water and wastewater systems and the potential energy impact of water conservation. Energy intensity profiles will include: - extraction and conveyance of water imported from outside a local watershed;- extraction of local surface and groundwater sources;- treatment and distribution of potable supplies; and- wastewater collection, treatment, and discharge. Total energy inputs are region specific as they are dictated by factors such as: water quality and availability, climate patterns, settlement patterns, level of treatment, treatment processes used, topography, distribution pumping and pressurization requirements, etc. In order to allow for comparison between study areas, an attempt will be made to develop a meaningful method to normalize water related energy use. Potential performance indices include energy use per capita, per hectare served, per fixture served, etc. This work will provide an opportunity to evaluate the methodology used in the project, the availability of the required inputs, the usefulness of the output derived and the potential applicability to other jurisdictions. The project is expected to be completed September 2006.

CMHC Project Officer : *Catherine Soroczan*	**CIDN** : 32290200
Division : Policy and Research Division	**STATUS** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

EVALUATION OF THE IMPACT OF WATER SOFTENER DISCHARGE ON SEPTIC SYSTEMS

Previous studies on the impact of water softener discharge on septic systems have been inconclusive, leading to conflicting regulatory requirements and potential damage to or extra costs for septic systems. This research project will be undertaken co-operatively by CMHC and the University of Guelph, Alfred College with collaboration from Agriculture Canada and guidance from the provinces of Ontario, B.C. and Alberta. The work will determine the impact of water softener discharge to septic systems. Testing will be undertaken on 30 households (15 with water softeners and 15 without). Physical, biological and chemical analysis throughout septic systems will be used to assess salt impact on bacterial population, detention time, and leach field soil permeability. Variables will be determined such as number of household occupants, age and type of septic tank, and frequency of water softener rejuvenation. This work will be undertaken in parallel with a study to determine septic tank bacterial morphology. A research report is expected for summer 2005.

CMHC Project Officer : *Catherine Soroczan*	**CIDN** : 32320200
Division : Policy and Research Division	**STATUS** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

EVALUATION OF WATER-EFFICIENT TOILET TECHNOLOGIES TO CARRY WASTE IN DRAINLINES: FINAL REPORT

CMHC in conjunction with Manitoba Conservation, City of Calgary, City of Toronto, Ontario Ministry of Municipal Affairs and Housing, Region of Durham, the Region of Peel and the Region of Waterloo has undertaken this project to address the impact of 6-litre toilet technology on drainline carry. This work was in response to concern expressed over the ability for 6 litre flows to effectively carry waste and not contribute to drainline clogging and backup. The project addresses the impacts of: slope, pipe diameter, sags, mass loading and pipe length on removal performance. A total of 9 different flush types were tested, including: wash down, flapperless, rim jet, and vacuum assist. Results indicated that parameters affecting drain line carry are loading mass, flush type and pipe slope.

Prepared by Bill Gauley and Johm Koeller. CMHC Project Officer: Cate Soroczan. Ottawa: Canada Mortgage and Housing Corporation, 2005. 47 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Drainline%20Report%20-%20WEB.pdf

EVALUATION OF WATER CONSERVATION PRACTICES

This research will provide municipalities with guidance in creating a cost effective water efficiency plan (WEP). The use of a standardized WEP will allow for practical and useful comparisons between water efficiency programs implemented across Canada. A template WEP will be developed to incorporate the variety of necessary parameters to be considered such as water source, population size and growth, regional socio-economic, climatic and geographic conditions, infrastructure status, target changes in water demands and wastewater flows, projected capital works and related costs, cost/benefit. The WEP template will include a software database for creating a water efficiency plan plus a report documenting the key components of water efficient planning. A draft report has been received and is under review. The final report is anticipated to be published by July 2005.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 30550200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

FIELD VALIDATION OF A RISK ASSESSMENT MODEL FOR ONSITE WASTEWATER SYSTEMS

The objective of this research project is to validate the Onsite Wastewater System Risk Assessment Model currently under development, by comparing field data of system failure to model parameters such as soil type, lot size or system age. Model validation will be based upon a comparison between signs of system failure and high risk ratings returned by the model. A proven risk assessment model can serve to assist planners, developers, and builders in determining the appropriateness of various onsite systems for different geological areas. With regards to existing systems, this tool can be used to assist municipalities in identifying high risk areas in order to prioritize inspection programs and remedial work. A draft report has been received for review and a final report is anticipated for summer 2005.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 26470219

Division : External Research Program — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available

FURTHER DEVELOPMENT OF THE B.C. WATER BALANCE MODEL

CMHC has supported the further development of the B.C. Water Balance Model by developing web-based content for use nationally. This on-line decision support tool is now structured to accommodate information from British Columbia, Alberta, Manitoba, Ontario, and Nova Scotia. The tool is designed to enable local government and other agencies in other provinces to share information as well as facilitate a national discussion forum on sustainable drainage initiatives, land use planning and watershed health. The site can be found at www.waterbalance.ca

STATUS : Completed

AVAILABILITY : Product is available on the web

INVESTIGATION INTO GERMAN RAINWATER CISTERN LEGISLATION, INCENTIVES AND CASE STUDIES

The purpose of this project is to find the appropriate agencies and contacts within Germany regarding rainwater cistern issues, and to document information related to rain water cistern use within Germany. A similar report on cistern issues within France and Belgium has been completed in draft form. A Research Highlight on the two draft reports is anticipated for summer 2005 and will incorporate results from a May 2005 CMHC sponsored workshop on rainwater harvesting.

CMHC Project Officer : *Catherine Soroczan* **CIDN** : 20870200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

RAINWATER HARVESTING WORKSHOP AND CHARRETTE

Canada Mortgage and Housing Corporation, in partnership with the City of Toronto, held a two day workshop and design charrette on Rainwater Harvesting (RWH) in May 2005, in Toronto. Experts from Germany, Australia, and Texas presented on RWH topics from their country including: Design parameters; Regulations – building, plumbing, water quality, application; Economic and social considerations; and Case studies. The tentative schedule included a full day workshop for Ontario municipalities as well as designers, builders, architects, developers, and homeowners. The charrette saw regulatory stakeholders work together with designers, developers, and the international experts to design RWH systems appropriate to Canadian climate and building specifications for three buildings. It is expected that this workshop will accelerate the adoption of rainwater harvesting as a viable option for potable water conservation and stormwater management by providing the Canadian audience with the necessary information on technology, financing, and regulatory issues. The design charrette will serve to promote multi-level government cooperation. Four other May and June venues - Halifax, Vancouver, Victoria ,and Calgary - have been added. See CMHC's web site calendar of events.

CMHC Project Officer : *Catherine Soroczan* **CIDN** : 29740200
Division : Policy and Research Division ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

STORM WATER MANAGEMENT AND ENVIRONMENTAL BENEFITS PROVIDED BY GREEN ROOFS IN MULTI-FAMILY HOUSING

Jointly funded by the British Columbia Institute of Technology (BCIT), the National Research Council, the Greater Vancouver Regional District, and CMHC's External Research Program, this research project will evaluate the performance of green roofs in a testing facility built at BCIT. It will gather and analyze data with respect to delaying storm water run-off and reducing run-off volume, as well as the cooling and insulating abilities of the roof system. Cost analysis will include energy cost savings and the cost of structural upgrades to support the roof. Expected date of completion is the fall of 2005.

CMHC Project Officer : *Sandra Marshall* **CIDN** : 26470213
Division : External Research Program ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

SUPPORT FOR THE CREATION OF A NATIONAL HOUSEHOLD RECLAIMED WATER GUIDELINE AND DUAL PLUMBING STANDARD

This project supports the development of a National Guideline for Residential Reuse Water Quality and a National Standard for Dual Plumbing Systems. The Water Quality and Health Bureau of Health Canada and Canada Mortgage and Housing Corporation (CMHC) are examining the water quality requirements that would allow sustainable reuse of water in a residential setting without imposing unnecessary risks to human health. CMHC is the secretariat to the Household Reclaimed Water Quality Working Group developing the water reuse guideline. The Working Group includes membership from Federal, Provincial and Territorial governments representing the F/P/G Committee on the Health and Environment. Additionally CMHC is supporting the Canadian Standards Association (CSA) technical committee that will address issues of cross contamination and back flow prevention through the creation of a National Standard for Dual Plumbing Systems. Close links and coordination will be established between these efforts. This work will be performed through to mid 2006.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 29590200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : Product is not yet available — ***NEW***

WATER CONSERVATION SEMINAR SERIES

CMHC, in partnership with Canadian Water and Wastewater Association, conducted one day seminar sessions across Canada in conjunction with the regional water and waste associations annual meetings. Earlier sessions were hosted in Penticton, Halifax, Toronto and Calgary. The latest and final session was held in conjunction with the recent April 2-5 2005 National Forum on Wastewater Treatment in Montreal. CMHC hosted a one day addition for deliberations on research and policy gaps related to onsite wastewater treatment and potential for national capacity building. There was general consensus to move ahead on identified next steps which included: the development of a national standard for technology evaluation (adapting the existing BNQ standard); development of installation standards through CSA, and development of national training and certification protocols through the BC Onsite and Alberta Onsite Associations.

CMHC Project Officer : *Catherine Soroczan* — ***CIDN*** : 19820200

Division : Policy and Research Division — ***STATUS*** : Ongoing

AVAILABILITY : There will be no product for this project — ***NEW***

SOCIO ECONOMIC RESEARCH

ACCEPTANCE OF MANUFACTURED HOUSING IN FIRST NATIONS COMMUNITIES OF THE ATLANTIC REGION

First Nations are growing population groups that experience a disproportionate share of housing-related challenges and can benefit from an increased number of affordable and quality housing options. The aim of this project was to identify barriers to, and opportunities for, economic and social development that can be derived from the broader adoption of manufactured housing on First Nations reserves in Atlantic Canada.

The study explores provision of manufactured housing as one of the approaches to address housing needs on First Nations reserves in Atlantic Canada by identifying:
- challenges to greater acceptance of manufactured housing;
- potential strategies to overcome these challenges; and
- economic and social development benefits that may be derived from manufactured housing.

Conducted by Dr. Ausra Burns, Research Associate, Rural and Small Town Programme, Mount Allison University. Ottawa: Canada Mortgage and Housing Corporation, 2004. 38 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre

ECONOMIC IMPACT OF HOUSING ON-RESERVE

This project will assess the impact of new housing construction and renovation on the economies of First Nations and the rest of Canada, and assess whether the relative development of a First Nation affects the overall impact of new housing construction or renovation on that community. The results will help illuminate the role of housing in aboriginal capacity development based on how much of this incremental benefit remains within the various communities.

CMHC Project Officer : *Tan M Crombie*

CIDN : 31680200

Division : Policy and Research Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

NEW

ESTABLISHMENT OF ON-RESERVE HOUSING AUTHORITIES

The research project will investigate and document the critical success factors associated with housing authorities or similar structures. This will aid First Nation communities in their quest for more efficient and effective housing system management. The report will identify issues, challenges and success factors. A number of potential housing management models will be reviewed to guide First Nations in the establishment of housing institutions, including housing authorities.

CMHC Project Officer : *Karen Bolt*

CIDN : 31841500

Division : Assisted Housing Division

STATUS : Ongoing

AVAILABILITY : Product is not yet available

EXAMINATION OF FIRST NATIONS HOUSING MANAGEMENT TRAINING PROGRAMS

First Nations housing managers face many challenges in effectively performing their duties: remoteness, limited training funds, cultural and language issues, etc. The primary goal of this research project was to identify what skills a housing manager in a First Nations community needs to be effective and what training opportunities are available or required. This study found that current training that meets the unique needs of First Nations housing managers is very limited, and made numerous recommendations on how to fill the gaps.

Prepared by Neegan Burnside Engineering and Environmental Ltd. CMHC Project Officer: Marcelle Marie Gareau. Ottawa: Canada Mortgage and Housing Corporation, c2004. 78 pages

Note: No. 03-024 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/RR_web_feb10.pdf

EXPLORATION OF HOUSING OPTIONS FOR ABORIGINAL PEOPLE IN EDMONTON AND WINNIPEG

This research will examine the housing situation of Aboriginal people in Winnipeg and Edmonton. It will look at the characteristics of the housing stock occupied by Aboriginal people; explore the types of housing options that Aboriginal people need and prefer; and examine how various forms of home ownership can become more widespread among Aboriginal people.

CMHC Project Officer : *Marcelle M Gareau*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26730200
STATUS : Ongoing

FEASIBILITY OF COMMUNITY RISK MANAGEMENT AS A SUBJECT FOR CAPACITY BUILDING IN ABORIGINAL COMMUNITIES

The objective of this project is to ascertain what are the components of risk management that are relevant in an Aboriginal community context, and to assess these against pragmatic criteria (as to whether the components can be taught in a capacity development environment & carried out by a typical Aboriginal community). The following tasks are envisaged: to review text and existing course materials; to determine what materials are relevant; to carry out interviews with risk management professionals & institutes, practitioners, CMHC, INAC & other capacity development personnel & Aboriginal groups; to do analysis; and to make recommendations for course content & training methods.

CMHC Project Officer : *Ed Nera*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 24280200
STATUS : Ongoing

FIRST NATION ECONOMIES: A COMPARATIVE PERSPECTIVE. A SOCIO-ECONOMIC BASELINE STUDY BETWEEN CITIES AND NON-FIRST NATION COMMUNITIES

This report discusses regional and First Nation economic development, on-reserve housing programs and the connection between housing and economic development. Five factors are used to develop a framework for analysis of local economic development: connection to cities, economic base, local capacity, housing and recent growth. Conclusions focus on the different economic development experiences of First Nation and non- First Nation communities.

Prepared by Informetrica Limited. Authors: Bert Waslander and Tyler Minty. CMHC Project Officer: Ton M. Crombie. Ottawa: Canada Mortgage and Housing Corporation, 2004. 57 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

FIRST NATION HOMEOWNERSHIP IMPLEMENTATION STRATEGY

This project will investigate and document the issues, impediments and opportunities of introducing homeownership options into First Nation communities. It will review existing models/mechanisms currently being employed in First Nations communities under the banner of 'homeownership', evaluate the effectiveness of the models and recommend 'best practises' in a final report. The report will identify the benefits of a homeownership component in a community based housing strategy, and recommend strategies to implement/integrate home ownership models into a community.

CMHC Project Officer : *Kathy Hague*
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available

CIDN : 31701500
STATUS : Ongoing
NEW

FIRST NATION HOUSING MANAGERS - PROFILE AND ORGANIZATIONAL NEEDS

This research project will provide a representative profile of on-reserve housing managers; identify gaps in training, education and skills; make recommendations on improving their professional development, assess the feasibility of developing a national representative organization and develop an action plan for its development.

CMHC Project Officer : *Deborah Taylor*
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available

CIDN : 31851500
STATUS : Ongoing
NEW

HOUSING DISCRIMINATION AND ABORIGINAL PEOPLE IN WINNIPEG AND THOMPSON, MANITOBA

The objectives of this project were: 1) to obtain baseline data on the nature and extent of discrimination in housing that Aboriginal people experience - case studies focus on Winnipeg and Thompson, Manitoba; 2) to quantitatively and qualitatively examine the key variables associated with housing discrimination for Aboriginal people, including such factors as residential migration/mobility and social cohesion.

Prepared by Corrado Research and Evaluation Associates Inc. CMHC Project Officer: Phil Deacon. Ottawa: Canada Mortgage and Housing Corporation, 2005, c2003. 77 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

HOUSING INDUCED MIGRATION BETWEEN ON- AND OFF-RESERVES

This research uses econometric modelling techniques to detail how housing impacts the migration of Aboriginal people on- and off-reserve. Where previous migration studies have been based primarily on interviews, this report will test the relationships between housing and non-housing related variables as drivers in migratory decisions. It will also discuss the significance and implications of the findings as they relate to Aboriginal programs and policies.

CMHC Project Officer : *Bruno Duhamel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31670200
STATUS : Ongoing
NEW

PATTERNS AND TRENDS OF URBAN ABORIGINAL RESIDENTIAL SETTLEMENT

This project will investigate the housing patterns of urban Aboriginal people and the links between these and the socioeconomic outcomes for these people, either positive or negative, associated with living in Aboriginal neighbourhoods. Housing settlement patterns in the major urban areas of Canada with substantial Aboriginal populations will be described statistically, using established indices for spatial distributions of population (evenness, clustering, concentration, centrality and isolation) at different levels of geographic aggregation. The statistics will be discussed in terms of the pros and cons of the indices and geographies for each urban centre. The statistics will then be input into an analysis with a selection of socioeconomic census variables. These variables will be chosen for their potential relevance to social and economic outcomes that have been suggested in the research literature.

CMHC Project Officer : *Phil Deacon*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25570200
STATUS : Ongoing

RESPONSIVE RESEARCH INTO ABORIGINAL HOUSING ISSUES: A PILOT PROJECT

The project will fund four research grants to university scholars for studies that combine an Aboriginal perspective, a housing & community focus and strong mentoring of new Aboriginal student researchers. Also included is an evaluation of the grant process. One research study has been completed, which looks at housing issues for Aboriginal post-secondary students.

CMHC Project Officer : *Phil Deacon*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25320200
STATUS : Ongoing

TEMPORARY SUPPORTIVE HOUSING FOR ABORIGINAL PEOPLE AND THEIR FAMILIES

First Nation members in many communities in northern Ontario must travel to regional centres to access community services, such as medical, health, educational and employment services. In most cases, they must also find temporary accommodation while accessing the services. The objective of this research is to examine the temporary housing situation of these First Nation members. The research will examine needs, preferences and issues while identifying solutions. The research will provide a general overview of the current situation concerning temporary accommodation in Sioux Lookout, Fort Francis, Kenora and Thunder Bay. This will include identifying the types of accommodation that are available, the reasons for which these accommodations are being used, and the costs that are associated with them.

ABORIGINAL HOUSING

CMHC Project Officer : *Marcelle M Gareau*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26740200
STATUS : Ongoing

USE OF DESIGNATED LAND ON-RESERVE FOR AFFORDABLE HOUSING

This research project will investigate and document the issues, impediments and opportunities in using designated land to facilitate affordable housing on-reserve and will communicate the results to First Nation communities and other stakeholders involved in housing on-reserve.

CMHC Project Officer : *Kathy Hague*
Division : Assisted Housing Division
AVAILABILITY : Product is not yet available

CIDN : 31691500
STATUS : Ongoing

CITY PLANNING AND HUMAN SETTLEMENTS

COMPARING CANADIAN NEW-URBANIST AND CONVENTIONAL SUBURBAN NEIGHBOURHOODS

This study will gather and compare data from new-urbanist developments and conventional suburban developments to determine if key objectives of new-urbanism have been realized. Variables to be examined include: car usage for weekday urban travel; access to daily destinations; pedestrian connectivity; housing choice; compactness; occupant satisfaction (e.g. pedestrian safety, aesthetic qualities); access to useful public open/green space; and interaction. The study will derive lessons learned about various neighbourhood design features and how well they achieve key objectives.

CMHC Project Officer : *Susan Fisher*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30610200
STATUS : Ongoing

ECONOMIC DEVELOPMENT IN SMALL COMMUNITIES

Small communities are characteristics of all provinces and territories in Canada. They vary not only by size, population density and economic activities, but also by degree of economic maturity. Over time, some of these communities have matured, while others have remained relatively unchanged. Still others have declined or even disappeared. However, there is no analytical tool to assess the economic characteristics and status of small communities in Canada. Hence, this project is intended to develop a framework that will enable analysts to gauge the stage of economic development of small communities, and the presence and direction of any trends.

CMHC Project Officer : *Jessica Yen*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30790200
STATUS : Ongoing

REQUALIFICATION OF SUBURBS AND REGULATORY FRAMEWORKS: CURRENT SITUATION AND EASING MEASURES

The objectives of this study are, first, to analyze the current regulatory frameworks that could support proposals for the requalification of Quebec suburbs and, second, to propose measures that could be introduced to make it easier for these districts to adapt to the social and physical changes that they are undergoing.

CMHC Project Officer : *Kevin Hughes*	***CIDN*** : 24370208
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

URBAN FORM AND SOCIAL INCLUSION

This project will investigate, through a literature review and discussions with key informants, the links between the physical form of a neighbourhood or community, and the creation and strength of social structures that contribute to a sense of inclusion and belonging for the inhabitants.

CMHC Project Officer : *Denis Losier*	***CIDN*** : 31810200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

CONTAMINATED LANDS

BROWNFIELD REDEVELOPMENT FOR HOUSING IN CANADA - LITERATURE REVIEW AND CASE STUDIES

This project researched and documented issues and best practices for the redevelopment of brownfield sites for housing across Canada. A literature review was undertaken to update information on issues and barriers to redevelopment of brownfield sites for housing. Key informants, such as developers, municipal planners, other government agencies, financial institutions and legal experts were interviewed. The report was completed in December, 2004 and includes a summary and analysis of the major findings, including the current key issues as they relate to brownfield redevelopment for housing. Six best practice case studies were also completed in December, 2004 of successful built residential projects in Canada. Each case study documents land use planning and regulatory approvals, project financing, design and construction, environmental remediation and other special circumstances. The case studies are available for viewing and downloading from the CMHC website. Six additional case studies are currently under development and will be completed in the spring of 2005. Note case studies available on the CMHC website at http://www.cmhc-schl.gc.ca/en/imquaf/hehosu/sucopl/sucopl_008.cfm

Report prepared by RCI Consulting and Regional Analytics Inc. CMHC Project Officer: Cynthia Rattle. Ottawa: Canada Mortgage and Housing Corporation, 2004. 113 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

COOPERATIVE AND NON-PROFIT HOUSING

DEVELOPING A STANDARD SET OF FLEXHOUSING/HEALTHY HOUSING FLOOR PLANS FOR USE BY NON-PROFIT HOME BUILDERS

This project will result in standard housing plans, construction details and specifications useful in the factory production of affordable housing units by non-profit builders across Canada, such as Habitat for Humanity. The plans would consist of a series of interchangeable modules to be used in the production of multiple building types such as single-family homes, semi-detached, duplex, etc.

CMHC Project Officer : *Collinda Joseph*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31940200
STATUS : Ongoing

END OF OPERATING AGREEMENTS: CHALLENGES AND OPPORTUNITIES FOR HOUSING COOPERATIVES

The objective of this External Research Program project is to encourage and support high quality innovative research by Canadian researchers in the private and non-profit sectors by exploring the challenges and opportunities of cooperative housing.

CMHC Project Officer : *Jean Gratton*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370219
STATUS : Ongoing

GUIDE TO CO-OPERATIVE HOUSING

This research will result in online information for co-operative housing agencies and members in each province and territory on their rights and responsibilities in regard to: admitting new members, obligations to the co-operative of members, obligations of the co-operative to members, eviction or expulsion of members, and collection of money owed.

Research by Biz-Sone Internet Group Inc. Ottawa: Canada Mortgage and Housing Corporation, 2005. 101 pages. (External Research Program Report) Disponible aussi en français : Guide de l'habitation coopérative

STATUS : New Completed Report
AVAILABILITY : CMHC web site
http://www.cmhc-schl.gc.ca/en/bureho/buho/gucoho/upload/63926_EN.pdf

HOME OWNERSHIP

ESTIMATING PRIVATE AND SOCIETAL HOMEOWNERSHIP COSTS AND BENEFITS IN CANADA

Support for homeownership is a public policy goal, but there are both private and societal costs and benefits associated with it. Private costs, in the absence of government intervention, are those accrued directly to the individual families, not society (e.g. payment of interest on mortgage). Societal costs, on the other hand, are those, in absence of government intervention, accrued to the individual families and society on an undivided basis (negative externality). Private benefits, in the absence of government intervention, are those accrued to individual families, not society (e.g. capital gain). Those accrued to the individual families and society on an undivided basis (positive externality) without government intervention are termed societal benefits. Since the distribution of homeownership costs and benefits varies by region, income and other socio-economic characteristics, the project estimates its private and societal impacts in selected Canadian cities including Vancouver, Calgary, Winnipeg, Toronto, Montreal and Halifax.

CMHC Project Officer : *Jessica Yen*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26590200
STATUS : Ongoing

ABORIGINAL HOMELESSNESS: A SCAN OF URBAN CENTRES

The intent of this project is to gain a better understanding of Aboriginal homelessness in urban centres in Canada, including developing a better profile of Aboriginal homeless people in urban centres; determining trends in the causes and conditions of urban Aboriginal homelessness; examining current and emerging methods of addressing urban Aboriginal homelessness; and examining the appropriateness of services that are, or can be, available to the urban Aboriginal homeless population.

CMHC Project Officer : *Marcelle M Gareau*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 25560200
STATUS : Ongoing
"NEW"

COST EFFECTIVENESS OF EVICTION PREVENTION PROGRAMS

Eviction disrupts the lives of tenants, and imposes costs on both tenants and landlords. In some cases, eviction can result in absolute homelessness, including reliance on emergency shelters and other social services. Successful eviction prevention initiatives can prevent these costly outcomes.

The objectives of this research study included documenting the costs to landlords, tenants and social services agencies resulting from eviction, as well as defining the costs and factors of success and failure in relation to programs and services that help prevent evictions.

The primary question addressed by the study is as follows: How do the different approaches to eviction prevention in Canada compare to each other in terms of costs and effectiveness, and how do the costs of these different approaches compare to the costs of eviction?

This overall research question is comprised of a series of sub-questions addressed by the study:
- What are the direct, quantifiable costs and non-quantifiable costs of eviction facing tenants, landlords, and social services agencies?
- What are the costs associated with preventing evictions?
- What are the factors of success and failure associated with effective or ineffective eviction prevention initiatives?
- Are the various eviction prevention initiatives accomplishing what they set out to do?
- Can eviction prevention initiatives be compared to each other?

In order to investigate these questions, researchers undertook a review of Canadian and international literature; telephone interviews with key informants; questionnaire-based interviews with 26 eviction prevention agencies and private and social housing landlords; interviews and focus group surveys of 32 individuals with a history of eviction; compilation of an inventory of 32 Canadian eviction prevention initiatives; an in-depth review of four eviction prevention agencies in the cities of Ottawa and Toronto; and a detailed comparison of six eviction prevention initiatives offered by the four agencies that were reviewed in-depth.

Prepared by Acacia Consulting & Research. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortgage and Housing Corporation, 2005. 208 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC-Cost%20EN(w).pdf

EXPLORATORY LONGITUDINAL STUDY ON EXITS AND RETURNS TO HOMELESSNESS IN WINDSOR

The research is based on a longitudinal survey of 120 homeless adults in Windsor. The study will examine: 1. What factors are associated with exits from homelessness into housing; 2. What dynamics are at play during periods of being housed; 3. What factors are associated with returns to homelessness for those that become homeless again; 4. The in-depth experiences of a subset of those who experience such exits and returns to homelessness; and 5. An appropriate longitudinal methodology that can track and follow people who are homeless.

The participants will be interviewed at three points in time: at baseline, 1 year after the baseline survey, and 2 years after the baseline survey. To be included in the baseline survey, an individual would need to have slept on the streets (including other unconventional sleeping places like car, abandoned building), in a shelter, in doubled-up housing where no rent is paid, or in a hotel or motel, within the last thirty days before the baseline interview.

CMHC Project Officer : *Anna Lenk*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370202
STATUS : Ongoing

HOMELESS APPLICANTS' ACCESS TO SOCIAL HOUSING: FINAL REPORT

The purpose of this research is two-fold:

- Investigate how social housing providers presently accommodate homeless applicants, and
- Assess how access to housing could be improved for homeless people.

This study of waiting list and application processes for social housing and the issues facing homeless applicants took place between April 2004 and February 2005. The research included a literature review, interviews with key informants, and data collection using survey tools and focus groups. A total of 20 housing providers from four provinces (Alberta, British Columbia, New Brunswick and Ontario) were interviewed by phone or in person. The providers were chosen to include representation from both large and small housing providers, public housing providers, non-profit providers, co-ops, supportive and alternative housing providers, and those housing special needs groups. The sample included both providers with independent units and with shared housing. The providers had a variety of target populations, including singles, families, seniors, homeless and 'hard to house,' Aboriginal households, and special needs tenants including those living with mental illness, brain injuries, addictions, and physical disabilities.

Staff from ten agencies in the four provinces were also interviewed for the study, to provide perspectives from front-line organizations working with homeless or at-risk clientele. The sample of agencies was purposely diverse to seek input from a range of organizations, including shelters and transitional housing, multi-service agencies, health and mental health organizations, and housing help and access centres for social housing.

Two focus groups, involving a total of 14 participants, were held to obtain input from individuals and families who were homeless or had experienced homelessness. One focus group was held with residents of Ecuhome Corporation, a non-profit provider in Toronto, housing homeless and 'hard to house' individuals. The second focus group was held with residents staying at the Peel Family Shelter in Mississauga, Ontario.

The results of the literature review, interviews and focus groups highlighted a wide range of barriers facing homeless people in accessing social housing. These barriers fall into three categories: systemic barriers, obstacles at the community or organizational level, and personal issues or limitations.

Prepared by Oriole Research and Design Inc. in partnership with Connelly Consulting Services. CMHC Project Officer: Anna Lenk. Ottawa: Canada Mortagage and Housing Corporation, 2005. 199 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/chic_may4_web.pdf

HOMELESSNESS

STABLE HOUSING FOR SUBSTANCE USERS (DRUG AND ALCOHOL): LESSONS FOR HOUSING PROVIDERS

This project is intended to be an investigation of innovative or alternative residential or housing programs for persons who are homeless or at risk of homelessness and are substance users. The research will include case studies of programs and service providers who consider their housing or residential facility as one which makes use of the harm reduction philosophy or approach, or are contemplating a modification of existing conventional approaches or creating new programs in this regard. The research should answer the question as to which housing interventions and which factors most effectively help homeless persons with addictions to access and, more importantly, maintain stable housing.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26770200
STATUS : Ongoing

TRANSFERABILITY OF THE SAFE IN THE CITY APPROACH TO YOUTH HOMELESSNESS PREVENTION IN CANADA

This External Research Program project is an analysis of the implementation of a British youth homelessness prevention program, "Safe in the City", and identification of the means and obstacles to adapting the model for use in Canada. The study objectives include an examination of: the partnership arrangements undertaken by Safe in the City and the borough agencies, the reasons why partners have become involved in the initiative, the roles that each plays, and the structure of the partnerships; the transferability of the Safe in the City approach to the Canadian context; and what factors support and impede such an approach.

CMHC Project Officer : *Anna Lenk*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370214
STATUS : Ongoing

HOUSE CONSTRUCTION INDUSTRY

PROFILE OF THE MANUFACTURED HOUSING INDUSTRY

This project is to undertake and complete a study of the manufactured housing industry. The objective is to develop a profile of the manufactured housing industry, with a view to better understand the current role and function of this industry. It will then investigate the level of integration of manufactured housing into the housing industry as a whole. Finally, it will document the level of innovation in the housing industry brought about by the manufactured housing technology.

CMHC Project Officer : *Eric Tsang*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31570200
STATUS : Ongoing
NEW

REPORT ON SKILLED CONSTRUCTION LABOUR SEGMENTATION AND MOBILITY: FINAL REPORT

This report presents the findings of a study of labour mobility in the construction industry in Canada. From the Terms of Reference for this project, the objectives of this report are to:

- Document the similarities and differences in labour requirements between housing construction and non-housing construction;
- Determine the extent to which labour moves back and forth between housing construction and non-housing construction; and
- Identify the elements in the formulation of a human resource development strategy that are common to both housing construction and non-housing construction as well as the elements in the formulation of a human resource development strategy that are distinct between housing construction and non-housing construction.

This project documents the significant labour requirement similarities and differences amongst residential construction, commercial construction (e.g. retail establishments), institutional construction (e.g. hospitals, schools), industrial construction (e.g. factories) and public works (e.g. roads, bridges). Residential construction is further divided into single-family, multi-family low rise and high-rise. This research is carried out using, for example, information from the National Occupational Classification data base.

The industry is composed of two fairly distinct sectors – residential and non-residential – with different skill requirements, regulations, wages, working conditions and training opportunities. Although there is some labour mobility across these two sectors, no comprehensive or definitive measurement has yet been compiled. The findings of this study suggests that a significant number of construction trades people work exclusively in one of the two sectors.

Prepared by Praxis Research & Consulting Inc. CMHC Project Officer: Bruno Duhamel. Ottawa: Canada Mortgage and Housing Corporation, 2005. 137 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Erp_skilled_cons_w1.pdf

VARIABILITY IN CONSTRUCTION INSURANCE AND ALTERNATIVE INSURANCE SOLUTIONS

This comprehensive report provides an overview of construction risks and traditional construction insurance products, as well as non-traditional insurance options and their implementation. Intended for builders and renovators, this research report includes a wealth of practical information on construction risks and traditional construction insurance, together with alternative construction insurance options such as captives and group insurance, and the implementation of non-traditional insurance programs.

This project documents the variability in residential construction insurance and analyses alternative residential construction insurance. The project findings include the recognition that the insurance market in Canada is still "hard" for residential construction insurance. Although somewhat improved, builders still face higher premiums, extensive use of warranties and a reduced number of insurance providers. The project details the various insurance options available and the potential variability builders face within these options, case studies of where such insurance is effective and who requires what insurance. The findings also highlight the use of alternative insurance provision in several cases in Canada and the United States by the residential construction industry. The report provides the details of such alternative insurance options and considerations for their implementation.

HOUSE CONSTRUCTION INDUSTRY

Prepared by Marsh Canada Limited. CMHC Project Officer: Eric Tsang. Ottawa: Canada Mortgage and Housing Corporation; Public Works and Government Services Canada, c2004. (Housing Affordability and Finance Series) 228 pages

Nota: Aussi disponible en français sous le titre : Variabilité de l'assurance dans le secteur de la construction et solutions d'assurance non traditionnelle

STATUS : New Completed Report

AVAILABILITY : OPIMS Call Centre (Order number 63852) and https://www.cmhc-schl.gc.ca:50104/b2c/b2c/mimes/pdf/63852.pdf

HOUSING

ALBERTA, AT HOME: COMMEMORATING ALBERTA'S 100TH ANNIVERSARY = ALBERTA CHEZ NOUS : UNE CÉLÉBRATION DU 100E ANNIVERSAIRE DE L'ALBERTA

Alberta at Home, is a bilingual picture book that highlights examples in the quality of life and housing over the past 10 years in Alberta. CMHC recently launched this book to commemorate the 100th anniversary of the founding of the province. The book is aimed at senior CMHC clients and stakeholders in the private and public sectors and is intended to foster a feeling of achievement and to reinforce the strong relationships that CMHC has built over the years.

The book is illustrated by photographs of a variety of people in rural and urban settings happily interacting in their home life. Young families are prominently featured and the home as a stabilizing factor in the lives of Albertans is underlined. The accompanying text also emphasizes Albertans' pride of home ownership, sense of community and desire for sustainable communities.

Conceived and directed by Rod Neander. Images created by Ric Kokotovich, with graphic design by Nelson Vigneault, image scanning by CleanPix Corp. and text by Trevor McConnell. Ottawa: Canada Mortgage and Housing Corporation, Prairies, Nunavut and Northwest Territories, 2004. 49 pages

STATUS : New Completed Report

AVAILABILITY : Canada Mortgage and Housing Corporation, Prairies, Nunavut and Northwest Territories,

DEVELOPMENT OF A HOUSING PROGRAM SIMULATION MODEL

The project is about assessing the feasibility of creating a housing policy simulation model for Canada based on the 2002 Ph.D. dissertation of Rainer vom Hofe entitled "A Regional Computable General Equilibrium (CGE) Model for Housing Policy Analysis: The Case of New York State". It will review vom Hofe's dissertation, with a view to better understanding the workings of the model. It will then assess the potential applications of the model, with and without modification, in simulating Canadian policy with housing implications. It will also discuss the options, including the pros, cons and implications for moving forward on the model development.

CMHC Project Officer : *Jessica Yen*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31590200
STATUS : Ongoing
NEW

EXAMINATION OF THE BOUNDARIES BETWEEN HOUSING AND INCOME SECURITY POLICY

The result of this study will increase awareness of the importance of housing in respect to broader social policy and income support policy in particular. This will contribute to the work of the Federal-Provincial-Territorial working group on affordable market housing, and potentially to other exercises such as the development of a market basket for measuring poverty and the design of future income support policy (e.g. National Child Benefit). This study will compare the housing and income support systems in four countries (Canada, United States, United Kingdom and Australia). It will focus on the structure of housing.

CMHC Project Officer : *Brian Davidson*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30140200
STATUS : Ongoing

FILTERING IN HOUSING IN CANADA

Downward filtering is a process where housing stock, as it deteriorates and becomes less expensive over time, passes from higher income households to lower income households. Gentrification is the reverse of downward filtering; it is a process by which higher income households displace lower income households in existing neighbourhoods, which results in housing price increases. The objective of this project is to determine the extent to which (i) filtering in housing (rental and owner-occupied housing) and (ii) gentrification has occurred in Canadian cities.

Note: No. 04-040 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Research Highlight
AVAILABILITY : CMHC Information Products and CMHC web site

INDIVIDUALIZATION OF BEHAVIOURS AND LIVING OPTIONS

The research project will achieve the following objectives:

- Enhance the knowledge of one-person households, by developing dominant socio-economic profiles of one-person households in the Montréal CMA.
- Determine, through a comparative analysis with Toronto and Vancouver, if the predominance of households of this type in Montréal results from a cultural phenomenon or a market structure specific to the Montréal area.
- Identify, by means of a telephone survey, the housing needs of one-person households.
- Indicate, on the basis of different dominant one-person household profiles, the major residential paths that could arise in the future.

CMHC Project Officer : *Jim Zamprelli*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370206
STATUS : Ongoing

DESIGNING A HOUSING ALLOWANCE PROGRAM

Many low-income Canadians have difficulty finding affordable housing. Housing allowances may offer a solution to this problem. Many questions need to be answered before a housing allowance program could be put into effect. Some of the questions involve major conceptual, implementation and cost issues, while others are more technical. This project examines these issues and will result in a report that could help policy makers develop an effective housing allowance program.

CMHC Project Officer : *Steven Ehrlich*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 29870200
STATUS : Ongoing
NEW

NOT IN MY BACK YARD (NIMBY) CASE STUDIES

This project will produce case studies on affordable housing from across Canada, but excluding Ontario, for use in a workshop initiative designed to provide municipalities, housing providers, social service agencies and related affordable housing service providers with tools, capacity and best practices to overcome the Not In My Back Yard (NIMBY) syndrome as it relates to affordable housing services. The case studies will provide examples of how community resistance related to affordable housing was, and can be, overcome.

CMHC Project Officer : *Denis Losier*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 29710200
STATUS : Ongoing
NEW

RECYCLING CATHOLIC CONVENTS AND RELIGIOUS INSTITUTIONAL BUILDINGS INTO AFFORDABLE AND ALTERNATIVE HOUSING: THREE CASE STUDIES

This project under the External Research Program will examine the recycling of religious institutional buildings in Quebec City into housing. An inventory of buildings that have been converted will be prepared and three case studies will be analyzed. Interviews will be conducted with the architects, municipal planners, occupants of the buildings and members of the religious order to assess the success of the housing project. Recommendations will be provided for future conversions of similar buildings. A draft report has been received and reviewed and the final report is being prepared.

CMHC Project Officer : *Susan Fisher*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 26470205
STATUS : Ongoing

ZONING AND AFFORDABLE HOUSING: A CRITICAL REVIEW OF THE GLAESER AND GYOURKO PAPER

The purpose of this project is to undertake a critical analysis of the Glaeser and Gyourko paper "The Impact of Zoning on Housing Affordability". This analysis is composed of three components: i) Understand the place of the paper in the literature on land use regulation and determine the extent of the general usefulness of the theoretical model to understanding the relationship between all facets of affordability and government regulations on new housing construction; ii) address questions on the extent to which the results of the paper are a unique artefact of the authors' data, including replication of the authors' work with alternative measures of construction costs and land use regulation; and iii) define and address the policy questions in Canada using existing sources of data on housing and government regulation.

Through these components, the contractor assessed the extent to which differences in house prices and housing affordability across Canada can be explained by land use regulations.

STATUS : New Completed Research Highlight

AVAILABILITY : No. 05-012 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

HOUSING AND IMMIGRATION

ADDRESSING DISTINCT HOUSING NEEDS: AN EVALUATION OF SENIORS' HOUSING IN THE SOUTH ASIAN COMMUNITY

This External Research Program project will examine the suitability and effectiveness of South Asian older adults' current housing options and support services by: 1) conducting a post-occupancy evaluation (a Post Occupancy Evaluation (POE) is research done to evaluate how well a built project implemented its goals and to fine-tune the building's performance) with South Asian residents in a seniors' housing project in Surrey, British Columbia; and 2) comparing these findings with housing conditions and the availability of support services for community-dwelling South Asian older adults in the Greater Vancouver Regional District (GVRD).

CMHC Project Officer : *Jim Zamprelli*

Division : External Research Program

AVAILABILITY : Product is not yet available

CIDN : 26470215

STATUS : Ongoing

METROPOLIS - CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues through a network of research centres in Canadian universities (Centres of Excellence). The results of the research will be used for the assessment of and development of policies and programs affecting immigrants and new Canadians. As an example, CMHC should benefit from research to be undertaken by the Centres in such areas as:

1. the effect of immigration on housing markets, demand and supply;
2. the effect of immigration on urban development, including issues of renewal of the urban core;
3. the impact of immigration on housing need, affordability, homelessness and the demand for social housing;
4. the social and spatial mobility of immigrants as compared with the profiles of the Canadian-born;
5. the relationship between immigration and the formation of ethnic, cultural or religious enclaves; the dynamics of enclaves - their role in integration (bridging or isolating), their economic role, their effect on city life, on urban renewal, on public safety, and so forth;
6. the relationship between metropolitan infrastructure (the quantity, quality and distribution of housing and public space) and immigrant integration.

Information on Metropolis and on close to 200 funded research projects can be found at www.canada.metropolis.net

CMHC Project Officer : *Jim Zamprelli*

Division : Policy and Research Division

AVAILABILITY : Product is available on the web

CIDN : 25640200

STATUS : Ongoing

HOUSING AND IMMIGRATION

LONGITUDINAL SURVEY OF IMMIGRANTS TO CANADA (LSIC) - DATA ANALYSIS OF HOUSING-RELATED INFORMATION

This project is a continuation of CMHC efforts to investigate the role of housing and communities as an integrative tool for newcomers, their effects on the housing market, and barriers to their accessing adequate shelter. Research and analysis of the Census and LSIC data will focus on housing needs and preferences, housing conditions, living arrangements, household formation, and housing experiences and histories of newcomers as they evolve towards achieving the goal of integration. Barriers, obstacles and success in the housing market will be examined. This project is a co-venture between CMHC, three Metropolis Centres of Excellence and the National Secretariat on Homelessness.

CMHC Project Officer : *Jim Zamprelli*
CIDN : 31920200
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HOUSING AND TAXATION

ASSESSMENT OF A LOW INCOME HOUSING TAX CREDIT PROGRAM FOR CANADA

The first objective of this study is to develop alternative design options for the Low Income Housing Tax Credit Program (LIHTC) in Canada. These include the US LIHTC as the base option. Canadians have the immense advantage of being able to learn from the US experience and to make changes to the LIHTC, in light of US evidence. More important, changes to the design of the US LIHTC would be needed to adapt it to the Canadian context, for the income tax treatment of rental real estate, the social housing environment and the structure of the real estate development industry. The second objective is to assess from a qualitative perspective, and when possible from an empirical perspective, the impacts and ultimate viability of each design and its implications, especially for government costs. This project report should be available in the second half of 2005.

CMHC Project Officer : *Bruno Duhamel*
CIDN : 26470206
Division : Policy and Research Division
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HOUSING EXPORT OPPORTUNITIES

CANADIAN DESIGN: CELEBRATING CANADA'S EXPERTISE IN ARCHITECTURE, LANDSCAPE DESIGN, INTERIOR DESIGN, AND COMMUNITY PLANNING = LA CONCEPTION AU CANADA : CÉLÉBRONS LE SAVOIR-FAIRE CANADIEN DANS LES SECTEURS DE L'ARCHITECTURE, DE L'AMÉNAGEMENT PAYSAGER, DU DESIGN D'INTÉRIEUR ET DE L'URBANISME

This directory includes projects designed by some of the most exciting and inventive Canadian planners, architects, landscape architects and interior designers working in China today.

Ottawa: Canada Mortgage and Housing Corporation; International Trade Canada, Trade Commissioner Service, 2004. 66 pages

Note: Text in English and in French

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products (Order number 63887) and http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/suexin/upload/CCDIC-ENGFNL.pdf

CASE STUDIES ON WOOD-FRAME CONSTRUCTION IN RUSSIA

This project's objective is to carry out case studies on existing Canadian wood frame houses in the cities of Omsk, Sakhalin, Rostov and Moscow in Russia to identify possible performance problems in their design and/or construction. The study will evaluate Russia's recently adopted Building Code for Single Family Houses and identify differences between this code and Part 9 of the Canadian code. In addition, the project will assess the extent to which the new Russian Building Code and regulations are available, understood, and enforced.

CMHC Project Officer : *Anand Mishra* ***CIDN*** : 30990900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

DEVELOPMENT OF CANADIAN LABELLING PROGRAM FOR CHILE

The Labelling program would provide foreign buyers with the assurance that the homes originated from Canada, were successfully certified, were adequately installed on-site to ensure expected system performance. The program will also offer training and after sales service support. On the other hand, Canadian participant members would benefit from a differentiation from the local and foreign competitors, an increased credibility based on the compliance to an independent quality control process which maximizes Canadian housing recognition and reputation abroad, and a protected trade mark, etc.

CMHC Project Officer : *Guy Lemieux* ***CIDN*** : 28860900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

EXPORT OPPORTUNITIES AND CONTACTS IN MEXICO

The main objective of this project is to increase the sale of Canadian building products in the Mexican market. The project will consist of identifying mid to high end construction projects in key Mexican markets (Mexico City, Guadalajara, Monterrey, and northern cities). The consultant will find projects and introduce Canadian technology to the key contacts of these projects. The general mandate will be to:

- provide project specific market intelligence;
- identify business opportunities for Canadian housing system and product manufacturers;
- facilitate export opportunities;
- promote Canadian construction technology in the Mexican market; and
- raise awareness of Canadian construction technology.

A final report will be submitted to CMHC that will include:

- the project details (type of project, project stage, type of building products needed, etc);
- key contact information for the project manager, specifier, architect and procurement officer;
- opportunities for Canadian exporters of building products and systems within the identified projects.

CMHC Project Officer : *Paulina Barnes* ***CIDN*** : 29400900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

EXPORTING TO RUSSIA: LESSONS LEARNED FROM THE CANADIAN HOUSING INDUSTRY PROJECT

The objectives of this project are:

-- to identify needs, challenges, and opportunities in the Russian housing market.;

-- to investigate the operational experience of Canadian housing exporters in Russia;

-- to identify export barriers, business opportunities and the challenges facing Canadian housing exporters in Russia;

-- to identify key success factors employed by Canadian housing exporters in Russia;

-- to assess the comparability between the requirements of the Russian housing market and the capabilities of the Canadian housing industry; and

-- to assess CMHC's past role in assisting the Canadian housing uxport industry to market effectively in Russia.

CMHC Project Officer : *Mietka Zieba*
CIDN : 28030900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HOUSING EXPORT MARKET: OPPORTUNITIES AND CONTACTS IN FRANCE

This comprehensive market study of the housing industry in France illustrates how Canadian wood-frame construction can carve out an important place for itself in the French market. Business opportunities for Canadian exporters of housing products and services are also outlined.

Prepared by Geomar International. Québec: Société d'habitation du Québec; Ottawa: Canada Mortgage and Housing Corporation, c2004. 160 pages

Nota: Aussi disponible en français sous le titre : Marché d'exportation dans le secteur de l'habitation : occasions et contacts en France

STATUS : New Completed Report
AVAILABILITY : CMHC International and HYPERLINK http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/suexin/upload/Housing-Export-Market-Opportunities-and-Contacts-in-France-2.pdf"http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/suexin/upload/Housing-Export-Market-Opportunities-and-Contacts-in-France-2.pdf

IMPACT OF CHINA'S NEW ENERGY EFFICIENT BUILDING CODE/CANADIAN HIGH-RISE OPPORTUNITIES

A study that presents Canadian solutions to help China attain new energy efficiency goals for high-rise housing.

CMHC Project Officer : *Marion A Rasmussen*
CIDN : 29220900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

INVESTIGATION OF THE DISTRIBUTION CHANNELS IN THE U.S. FOR FIVE PRODUCTS

To provide market intelligence on distribution channels for Canadian housing exporters, a study will be conducted. The study will investigate the best distribution channels and contacts for five products in five different States or areas. The US Team members selected the following products and states according to key clients needs. The States and regions are: Colorado, Michigan, New England States, New York State and Florida. The products are : 1) Doors & Windows; 2) Pre-Engineered and Panelized Products; 3) Cladding; 4) Heat & Ventilation Systems (HVAC and HRV) and 5) Architectural Millwork.

CMHC Project Officer : *Marie-Hélène Pastor* ***CIDN*** : 31150900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

IRISH HOUSING MARKET INFORMATION AND INTELLIGENCE

The proposed research project aims at providing Canadian suppliers of housing systems with timely market intelligence on: a) the demand for their products in the Irish market; b) the existing competition on this market; and c) market access issues. The research results will provide a greater understanding of the market structure and its key stakeholders for the benefit of the Canadian housing industry. The information and intelligence obtained through this project will further allow Canadian companies to better define their market entry strategies and as a result, improve their chances of success on this market.

CMHC Project Officer : *Roger Leger* ***CIDN*** : 29330900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

MARKET DEVELOPMENT INITIATIVES IN NEW ENGLAND

The purpose of this project is to draft a report covering all the information that could help exporters in the residential construction sector (single-family, multi-family, social and upscale housing) who would like to increase their market share of the New England market, and make this report available on the CMHC Web site.

CMHC Project Officer : *Guy Lemieux* ***CIDN*** : 29350900
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available ***NEW***

PRODUCT CERTIFICATION ROADMAP

A product certification roadmap will be developed which will provide key Chinese approval agency contacts and procedures for selected product categories. Practical advice for product certification will be included.

CMHC Project Officer : *Terry Robinson* ***CIDN*** : N/A
Division : CMHC International ***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available

ROADMAP TO PRODUCT APPROVALS IN RUSSIA

The study will address the following issues and information needs: the degree to which certification is mandatory, relationships between product certification and building products, alternate routes for local and national approvals, the respective roles of competing Russian agencies and jurisdictions, identification of key contacts within these agencies, the acceptability of Canadian standards and test data. For the specific product categories to be studied in detail, additional information will be collected on technical requirements, relevant Russian or international standards, etc.

CMHC Project Officer : *Mietka Zieba*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 28880900
STATUS : Ongoing

SENIORS HOUSING RESEARCH PROJECT IN TOKAI REGION

It is estimated that within 50 years Japan will become a super-aged society where the elderly account for approximately one third of the population. This report centres on the housing issues faced by the Tokai region which accounts for about one-tenth of the total Japanese population. The purpose of the study is to identify how Canada's expertise on housing the elderly can be applied to Japan in the best way possible.

Prepared by Research Institute for Regional Planning and Developments. Ottawa: CMHC International, c2003. 65 pages

Nota: Aussi disponible en français sous le titre : Étude sur le logement des aînés dans la région de Tokai

STATUS : New Completed Report
AVAILABILITY : CMHC International and HYPERLINK http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/suexin/upload/seniors%20tokai%20report.pdf"http://www.cmhc-schl.gc.ca/en/homadoin/excaprex/suexin/upload/seniors%20tokai%20report.pdf

STUDY TO IDENTIFY THE CHANGES HAPPENING TO THE JAPANESE BUILDING REGULATIONS AND ITS IMPACTS ON CANADIAN INDUSTRY ACTIVE IN JAPAN

A document will be produced in English to be distributed to Canadian housing suppliers of products and systems. The document will outline a path by which Canadian housing industry can follow to meet current changes happening in the regulatory environment which will assist sustaining and expanding market share. The document will provide an overview of legislation and regulations that guide the building industry in Japan; describe type approvals and product specific approvals and what they mean and in which cases they can be used; describe the various testing and approval facilities etc.

CMHC Project Officer : *Laura Diakiw*
Division : CMHC International
AVAILABILITY : Product is not yet available

CIDN : 27380906
STATUS : Ongoing

HOUSING EXPORT OPPORTUNITIES

SUPPORT TO PREFAB AND ENGINEERED WOOD INDUSTRY

CMHC wishes to offer business opportunities to Canadian exporters of prefab houses, multi-family projects and value-added components, including advice on distribution networks. To attain its objectives, CMHC must conduct research with the assistance of an American consultant specializing in this area. The main goal of this study is to contribute to increasing Canadian exports of residential construction products by identifying the best business opportunities, while emphasizing the competitive benefits of the products.

CMHC Project Officer : *Guy Lemieux*
CIDN : 31240900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

UNITED KINGDOM AND IRELAND: RESEARCH PROJECT TO PROVIDE SUPPORT TO THE CANADIAN HOUSING INDUSTRY

This is a 10-month pilot initiative based on learned results from the 2002 Pilot Project which planned to identify and research United Kingdom-based housing partners, agents and representatives, match them with Canadian housing firms and disseminate the acquired market intelligence within the Canadian housing industry. That project confirmed the need to better align our market entry strategies with the UK market structure. Accordingly, two separate programs will be run, one for systems manufacturers and one for product manufacturers and two independent consultants will be engaged.

CMHC Project Officer : *Eliska Jerzabek*
CIDN : 31210900
Division : CMHC International
STATUS : Ongoing
AVAILABILITY : Product is not yet available

HOUSING FINANCE

CRITICAL SUCCESS FACTORS FOR COMMUNITY LAND TRUSTS IN CANADA: FINAL REPORT

A Community Land Trust (CLT) is an innovative approach to providing perpetually affordable housing to low- and moderate-income households. CLTs exist all over the world, taking on a variety of different forms. They have a long-standing tradition in Europe, and in the United States, they have been promoted since the 1960s. Today there are over 115 active CLTs in the U.S. spanning 31 States. In Canada, the tradition is less established, with only a handful of CLTs operating across the country.

Community Land Trusts in both countries have met with varying degrees of success. Some have continued to flourish over two decades while others have dissolved within a few years of incorporating. This study examines those key factors that are instrumental in the success of a CLT. The study includes profiles of twelve CLTs across Canada and the United States, demonstrates the range of models available for providing perpetually affordable housing through a CLT, identifies the key challenges and successes CLTs are likely to experience in their efforts to provide perpetually affordable housing; and shares those key learnings (best practices) that each of the profiled CLTs has gained over time.

Prepared by Housing Strategies Inc. CMHC Project Manager: Kamal Gupta. Ottawa: Canada Mortgage and Housing Corporation, 2005. (External Research Program Research Report) 155 pages

Note: No. 05-010 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report and Research Highlight
AVAILABILITY : Canadian Housing Information Centre

PRE-ARRANGED FINANCING FOR NEW HOME BUYERS

This project will document and discuss the policies and practices associated with pre-arranged mortgage financing arrangements made available to new homebuyers through their homebuilder. This will lead to a better understanding of the role of pre-arranged financing in the business model of Canadian homebuilders and how it may contribute to access to homeownership. Specifically, this research will explore and document the terms and conditions of pre-arranged financing and explain how they have evolved over the last decade. It will document who are the providers of pre-arranged financing including both institutional and non-institutional mortgage players and explain their respective roles and any changes over time. As well, it will investigate the impact of pre-arranged financing on access to homeownership and provide a prognosis for the future of this type of product. This study will raise awareness about pre-arranged financing options available for Canadian homebuilders.

CMHC Project Officer : *Steven Ehrlich*	**CIDN** : 31580200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

STUDY THE IMPACT OF INCORPORATING RESIDENTIAL ENERGY COSTS INTO MORTGAGE CALCULATIONS

The objectives of this project are to justify the creation of Green Mortgage products to the Alberta mortgage industry through a stakeholder committee by presenting supporting data demonstrating low risk and need. Stakeholder creation of Green Mortgage products would be further supported by the development of an implementation template for industry.

CMHC Project Officer : *Anand Mishra*	**CIDN** : 31620200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

UNDERSTANDING THE RELATIVE UNDERDEVELOPMENT OF REITS IN CANADA

A Real Estate Investment Trust (REIT) is a security consisting of a managed pool of capital, units of which are traded on stock exchanges. Investors, also called "unit holders", have an undivided beneficial interest in the properties owned by the REIT. Investors purchase "units" and receive a right to a proportional income stream resulting from the properties owned by the REIT. At regular intervals, usually monthly, investors receive "distributions". These distributions are the rents collected by the REIT, passed along to the investor. At the time when the investor sells his or her units, if the value of the units has increased in the market, the investor also receives a capital gain equal to the value between the sale price and the original purchase price of the units. REITs should not be confused with debt instruments.

The benefit of these vehicles to Canadian investors is that any income earned on the properties that is distributed to unit holders is deducted from the REIT-level tax bill. Instead of receiving its tax revenue on the rental income from the REIT directly, the government receives tax on the distribution from the unit holder who is taxed on the taxable portion of the distributions at his or her personal marginal rate. In addition, the unit holder is able to shield portions of the distribution from tax because the capital cost allowance claimed at the REIT level reduces taxable income, but not cash flow for the unit holder.

This report assesses apartment and non-apartment REITs in the Canadian and in the American context. The main objective of this examination is to identify barriers and opportunities impacting apartment REIT growth in Canada.

HOUSING FINANCE

This report develops a framework for understanding the relative underdevelopment of REITs in Canada when compared to the American REIT industry. The framework identifies the factors in the Canadian environment that have contributed to the Canadian industry currently being less developed than its U.S. counterpart. Further, a summary of the drivers of success for both apartment and non-apartment REITs in both Canada and the U.S. is presented, based on the study of the participants in both environments. The overall intent of these examinations is to suggest a list of suggestions that could enable the Canadian REIT industry in general, and the Canadian apartment REIT industry specifically, to eventually mirror the success seen in the U.S.

Prepared by David W. Conklin, Darroch A. Robertson, and Darcy J.L Jones. Ottawa: Canada Mortgage and Housing Corporation, 2002. 74 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/undersrtanding_web_feb23.pdf

HOUSING FORECASTING AND DEMAND

COHORT ANALYSIS OF CANADIAN HOUSING TRENDS

This External Research Project will use cohort data to explore the housing careers of Canadians living in all regions of the country and born between 1905 and 1974. The objectives of the work are to examine how the housing careers of birth cohorts differ from that which might be deduced from cross-sectional data, to identify differences among cohorts, and to relate the housing careers of cohorts to the socio-economic conditions they have experienced. The analysis should provide insights into the viability of forecasting future behaviour of households using different types of data; for example, it could be that cohort data will suggest different implications for housing choices in the future than cross-sectional data.

CMHC Project Officer : *Roger D Lewis*

Division : External Research Program

AVAILABILITY : Product is not yet available

CIDN : N/A

STATUS : Ongoing

HOUSING INDICATORS AND DATA

CHAÎNES COGNITIVES ET LE RÔLE DES VALEURS DANS LE MARKETING DES PRODUITS D'HABITATION

The means-end chains theory stipulates that a consumer chooses a product on the basis of the attributes it presents, and that these attributes provide the desired consequences. According to this theory, these consequences in turn satisfy the individual's values. The means-end chains theory makes it possible to identify personal values that direct consumer choices. This theory permits, among other things, the development of customized marketing campaigns. In some cases, it also enables products to be developed or existing products to be modified in relation to consumer personality.

In this context, this methodology was applied to homebuyers. On the one hand, the purpose was to verify whether the model was applicable to housing. If so, it was then necessary to validate the model's relevance for supporting marketing efforts by the Canadian factory-built housing industry.

The objectives of this project were to:

- Verify the applicability of the means-end chains model in the Canadian housing sector.
- Improve knowledge of the deep-seated reasons guiding homebuyers' decisions.
- Suggest courses of action for developing marketing strategies adapted to the homebuyer market.

Prepared by Patrick Lavoie and François Robichaud. CMHC Project Officer: Bruno Duhamel. Ottawa: Canada Mortgage and Housing Corporation, 2004. (External Research Program Research Report) 74 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/chainreport_web.pdf

EVOLVING HOUSING CONDITIONS IN CANADA'S CENSUS METROPOLITAN AREAS, 1991-2001 = ÉVOLUTION DES CONDITIONS DE LOGEMENT DANS LES RÉGIONS MÉTROPOLITAINES DE RECENSEMENT DU CANADA, 1991-2001

As part of the federal government's dialogue on the opportunities and challenges facing urban areas, Statistics Canada has been asked to undertake a project that would provide key background information on the trends and conditions in Canadian Census Metropolitan Areas (CMAs) across a number of dimensions. As part of this initiative, CMHC's authoritative CMA report examines and analyses: demographic and housing market trends; the evolution of housing conditions; housing need; households at high risk of housing need; the distribution of housing need on evolving housing trends and conditions in census metropolitan areas. Included in the report is an extensive roster of detailed statistical tables supporting the analysis and conclusions.

Prepared by John Engeland, Roger Lewis, Steven Ehrlich, and Janet Che. Ottawa: Statistics Canada, 2005. (Trends and Conditions in Census Metropolitan Areas; no. 005) 190 pages Bilingual

Note: No. 04-039 in the Research Highlights Socio-economic Series summarizes the results of this research and is available on the CMHC web site.

STATUS : New Completed Report

AVAILABILITY : On the Statistics Canada web site for free as Catalogue no. 89-613 MWE. To obtain single issues, visit the web site at www.statcan.ca. and select Products and Services.

PROFILE OF ABORIGINAL HOUSING CONDITIONS USING THE ABORIGINAL PEOPLE'S SURVEY (APS) - DATA ACQUISITION

This initial stage of the Project involves acquiring the data necessary for analysis. Statistics Canada APS data will be linked to CMHC's 2001 Census-based indicators. CMHC has met with Statistics Canada to ensure that APS data can be linked with the 2001 Census core housing need files. Development of data specifications and research issues will arise through consultation with stakeholders, primarily internal. The next stage of the project involves hiring a consultant to analyze the data, and this will occur as part of a separate Part IX project planned for the 2005 Commitment year.

CMHC Project Officer : *David A Metzak*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 29560200
STATUS : Ongoing
NEW

PROFILE OF HOUSING CONDITIONS OF PEOPLE WITH DISABILITIES - DATA ACQUISITION

This initial stage of the Project involves acquiring the data necessary for analysis. Statistics Canada PALS data will be linked to CMHC's 2001 Census-based indicators. CMHC has met with Statistics Canada to ensure that PALS data can be linked with the 2001 Census core housing need files. Development of data specifications and research issues will arise through consultation with stakeholders, primarily internal. The next stage of the project involves hiring a consultant to analyze the data, and this will occur as part of a separate Part IX project planned for the 2005 Commitment year.

CMHC Project Officer : *David A Metzak*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 29550200
STATUS : Ongoing
NEW

SUPPLEMENTARY APPROACHES TO GATHERING HOME RESALE DATA AND INFORMATION

Supplementary Approaches to Gathering Home Resale Data and Information will explore alternate sources of home sales data. Specifically, the project is intended to build upon the findings and recommendations of the previous CMHC study, Feasibility Study for Developing a Total Home Sales Database (July 2000). The research will review current resale data sources, evaluate recent developments and uncover further sources of resale data in Canada. New data sources will be reviewed and tested against current sources of data and information needs. In addition, this project will identify and assess sources of home sales data in other OECD countries. The project aims to improve the validity, reliability and timeliness of all home sales data. The research will enhance the understanding of Canada's home sales market and offer flexibilities in data collection.

CMHC Project Officer : *Kristopher Leaman*
Division : Market Analysis Centre
AVAILABILITY : Product is not yet available

CIDN : 31981000
STATUS : Ongoing
NEW

'WHO CAN AFFORD TO LIVE THERE?': INCOME BY OCCUPATION VERSUS HOUSING COSTS

The intent of the project is to develop and apply a methodology for annually measuring the housing affordability faced by a number of low-to-moderate income occupations in Canada's Census Metropolitan Areas based on each occupation's full-time employment earnings and local housing costs.

CMHC Project Officer : *David A Metzak*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 32030200
STATUS : Ongoing
NEW

IMPACT OF THE 2010 OLYMPICS ON THE VANCOUVER AND SEA-TO-SKY HOUSING MARKETS

This project will gauge how the housing markets in Vancouver and communities along the Sea-to-Sky highway are anticipated to react to developments during pre- and post-Olympic years. It will analyze the current housing market situation then develop a model based on historic data and experience typical of other Olympic host cities and the Canadian experience of similar events. The research will identify anticipated changes in the market which are a result of the 2010 Olympics and not due to overall market trends. This project will provide useful and important market information to CMHC and its clients on new and existing house prices, construction activity, sales volume, investor activity and the rental market in Vancouver and in communities along the Sea-to-Sky highway including Whistler, Squamish, Lillooet and Pemberton. It is envisioned that the effects will be captured as part of a time series which includes forecasting estimates of the impact of the 2010 Olympics from 2003 to 2012. The research will also include the identification of housing market trends and the market outlook.

CMHC Project Officer : *Greg J Goy*
Division : Market Analysis Centre
AVAILABILITY : Product is not yet available

CIDN : 32021000
STATUS : Ongoing
NEW

STRUCTURAL CHANGES IN MONTREAL AND OTHER MARKETS IN QUEBEC

The objective of this project is to investigate whether or not Montreal has undergone some structural changes over time by identifying the indicators of these changes. This research will also provide a comparative analysis with markets (CMAs) in, as well as outside Quebec, that have gone through structural changes, based upon indicators, the extent, the reasons, whether these changes are temporary or permanent, future direction and implications of the changes.

CMHC Project Officer : *Bruno Duhamel*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 28770200
STATUS : Ongoing

VARIATION DES PRIX DES LOGEMENTS AU CANADA : RAPPORT FINAL

This project is mainly aimed at explaining housing price variations in major Canadian cities for the period from 1972 to 2002, using both supply-side and demand-side factors. With the dynamic responses, it is possible to make certain matches between metropolitan areas. The similarities are primarily the result of geographical logic. In fact, the Calgary and Edmonton areas often exhibit similar dynamic responses, as do Montréal and Québec. Halifax and Ottawa-Gatineau have behaviours that tend to resemble the behaviours of Montréal and Québec. In certain respects, Toronto and Hamilton exhibit similar dynamics. Finally, Vancouver exhibits dynamic responses that differ the most from the behaviours of the other urban centres. Still, the different urban centres display dynamic housing price behaviours that are, in several respects, specific to them.

Prepared by Yvon Fauvel. CMHC Project Officer: Bruno Duhamel. Ottawa: Canada Mortgage and Housing Corporation, 2005. 99 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and
Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/CHIC_La_variation%28w%29.pdf

DEVELOPMENT OF COSTING MECHANISM(S) TO FACILITATE SUSTAINABLE COMMUNITY PLANNING

The purpose of the project is to develop a mechanism(s) that will allow community planners to effectively calculate and convey the full, accurate, long and short term public infrastructure costs of both conventional and more sustainable community planning scenarios. Phase 1 will identify relevant commercially available or partially developed infrastructure costing models and tools and community scenario building tools; identify current relevant sources of financial costing information related to the direct, indirect and external costs affected by development; document current costs for a full range of conventional and alternative infrastructure elements; identify the key costs affected by urban form and the factors that affect them most; apply the key costs to six development scenarios and develop cost/revenue statements for each scenario; construct a methodology to permit planners to effectively calculate and convey reliable net public cost projections for a full range of sustainable community planning scenarios; and if no tool currently exists, develop a framework for a methodology or tool by which the diverse sources and currently unrelated tools used above might be integrated into a single costing/scenario development exercise. Phase 2 of the project will involve the development of a costing scenario tool using the data collected in Phase 1.

CMHC Project Officer : *Douglas B Pollard*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26950200
STATUS : Ongoing

PERSONS WITH DISABILITIES

COST BENEFIT OF RENOVATIONS TO ACCOMMODATE A DISABILITY

This research will investigate the types and costs of renovations that seniors and persons with disabilities have carried out in their home -both single family homes and apartments- to offset the effects of disability. It will also examine the potential impacts of the renovations on:

a) occupants, in terms of helping them carry out activities of daily living, enhancing their independence, preventing them from moving out of their homes, etc.;

b) home care workers, with respect to helping them do their jobs more efficiently, safer, more effectively, etc.; and

c) agencies providing health and home care services, in terms of changes in the frequency or types of services required, ease of providing the services, cost, etc.

The study will also examine the potential impact of home renovations, when combined with the necessary social, health and home care services, on the need for institutional care.

CMHC Project Officer : *Luis Rodriguez*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26800200
STATUS : Ongoing

ÉVALUATION DE L'EXIGENCE PHYSIQUE À MONTER DES RAMPES D'ACCÈS EN FAUTEUIL ROULANT MANUEL CHEZ LES ADULTES ÂGÉS DE 18 À 64 ANS

This research studied the physical effort needed for a manual wheelchair user to climb three access ramps: one with a slope of 1 in 10, that is, a ramp that rises one unit every 10 units in length; a second with a slope of 1 in 12 and a third with a slope of 1 in 20.

There were two research hypotheses:

1. physical requirements vary according to the slope of the ramp, and
2. the ability to propel a wheelchair differs with age.

The study was unique. The few previous studies about the physical effort needed to propel a manual wheelchair used men in excellent physical condition who were long-time users of wheelchairs. For this study, the researchers tested 39 men and women who do not normally use wheelchairs. Two age groups were studied: those 18 to 39 years and those 40 to 64 years old.

The results showed that a slope of 1 in 20 is significantly easier to climb in a wheelchair than slopes of 1 in 10 and 1 in 12. There was, however, little difference between the effort needed to climb a slope of 1 in 10 and a slope of 1 in 12. The results did not show any age-related differences.

The research provided a unique opportunity to reflect on currently recommended standards for the slope of wheelchair ramps. However, before reaching any conclusions, there should be further research that includes people older than 64 years of age, and people who use wheelchairs. Research should also be undertaken on the risks of tipping over when using a wheelchair on access ramps.

Prepared by Jacqueline Rousseau, Rachid Aissaoui, and Daniel Bourbonnais. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2003. (External Research Program Research Report) 56 pages

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and
ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/fr_unilingue/CHIC_report_evaluation_web_march11.pdf

HOUSING NEEDS AND OPTIONS FOR ADULTS WITH INTELLECTUAL DISABILITIES

This research identifies housing needs and explores housing options (primarily supportive housing) for adults with intellectual disabilities. It includes an examination of: the availability of housing and support services, best practices, the role of parents of adults, risks such as homelessness, housing requirements of people with multiple disabilities, and gaps in the availability of housing.

CMHC Project Officer : *Anna Lenk*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31930200
STATUS : Ongoing
NEW

RENOVATION OF HOME TO INCLUDE CEILING TRACK SYSTEM FOR PEOPLE WITH DISABILITIES

This project will determine best solutions to renovating homes to include a ceiling track system that allows a parent of a child or caretaker of an adult with a severe physical disability to move him/her from one room to another easily. The project will also determine how to reinforce ceilings in a home to support the installation of this type of system. Research will be conducted by visiting homes with this system in place, determine where difficulties exist and determining best solutions. This project will improve the renovations of homes using a ceiling track system used for the transfer from one room to another of children and adults with severe physical disabilities.

CMHC Project Officer : *Collinda Joseph*	***CIDN*** : 31950200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

UPDATING AND ENHANCING CMHC PUBLICATIONS REGARDING CONSTRUCTION AND RENOVATION OF HOMES FOR PEOPLE WITH DISABILITIES

The objective of this project is to produce a number of publications in the CMHC About Your House (AYH) series for use by persons with disabilities, architects, occupational therapists, renovators, builders and the general public. Each will be based on information, to be updated, in the publication Housing for Persons with Disabilities and will take into account information contained in other FlexHousing™ and Health Housing™ publications. The titles for the AYH series include Exterior Areas, Interior Public Areas, Interior and Exterior Ramps, Kitchens, Bathrooms and Living Spaces, among others.

CMHC Project Officer : *Collinda Joseph*	***CIDN*** : 31960200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

RENTAL HOUSING

BEST PRACTICE GUIDE FOR RESIDENTIAL RENTAL PROPERTY INVESTORS

The objective of this project is to produce a best practice guide for individual residential rental property investors in the Toronto Census Metropolitan Area. The guide content and accompanying tools will provide detailed information on property acquisition and property management. It will include a profile of the Toronto rental environment and information specific to various property types. This guide will help raise awareness of the rental investment process and serve as an alternative to outsourcing the management of the properties.

CMHC Project Officer : *Tan M Crombie*	***CIDN*** : 30740200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

HOUSING STABILITY INDICATORS AND IMPACTS: FINAL REPORT

Housing plays a central role in the economic and social well-being of Canadians and provides an important foundation from which to build healthy and sustainable communities. While there is evidence to suggest that the majority of Canadians are well-housed, there is growing concern that increasingly some households may be falling further behind in terms of their ability to access decent, stable and affordable housing. This study looked at the experiences and circumstances of more than 700 renter households across Greater Vancouver to gain a better understanding of the housing choices available to them and the level of stability associated with these choices. This study also looked at some of the compromises, trade-offs and coping strategies adopted by families and individuals finding themselves in vulnerable situations.

Prepared by Jason and Lorraine Copas, Community Focus. CMHC Project Officer: John Engeland. Ottawa: Canada Mortgage and Housing Corporation, 2005. (External Research Program Research Report) 146 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

ISSUES AND STRATEGIES FOR SHARED ACCOMMODATION

The research question is: considering that sharing accommodation is a good economic strategy for low-income single tenants, what strategies could facilitate this housing arrangement? Within the larger research question, there are two objectives for this research: 1. For low-income single people who do not require supportive housing, identify barriers to shared housing, and strategies to successfully facilitate sharing in order to increase housing affordability. 2. For supportive housing providers and tenants, examine the factors which facilitate informal sharing, and identify (a) practices which could be adopted by supportive housing providers, and (b) factors which are difficult to replicate in supportive housing.

CMHC Project Officer : *Anna Lenk*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30320200
STATUS : Ongoing

RESIDENTIAL DEVELOPMENT

ASSISTING THE CITY OF STRATFORD TO IMPLEMENT THE FUSED GRID CONCEPT

The purpose of this project was to assist the City of Stratford in assessing the benefits of using the Fused Grid planning concept. This assessment was done in the following steps: 1. Alternative plans were drawn for the area of the newly annexed lands. 2. The plans were analyzed for the following quantitative attributes: a) Length of streets; b) Total land area allocated to streets; c) Developable land area; d) Total open space; e) Traffic impact. 3. The plans were also analyzed for qualitative attributes such as connectivity, walkability, safety, tranquility, and delight. For these qualitative attributes measurable indicators were applied to evaluate performance. 4. The plans were evaluated for their impact on municipal capital expenditures and operation and maintenance expenditures with regard to infrastructure elements that are installed and maintained by the city. Following the presentation of the results of these analyses to the City, the planning committee and council selected the Fused Grid alternative, as adapted to the specific site constraints, as the official secondary plan for the annexed lands.

CMHC Project Officer : *Fanis Grammenos*
Division : Policy and Research Division
AVAILABILITY : Research highlight is available
CIDN : 28210200
STATUS : Ongoing

RESIDENTIAL DEVELOPMENT

CASE STUDIES OF SUSTAINABLE GREENFIELD RESIDENTIAL DEVELOPMENTS

The current approach to residential development that consumes open space on the urban fringe for single-detached dwellings on large lots is recognized as neither economically nor environmentally sustainable. This project is to document sustainable ("green") residential development case studies from across Canada so that developers, municipalities, housing professionals, and community groups can learn about success stories and replicate these "green" solutions, where applicable.

CMHC Project Officer : *Mark Holzman*	***CIDN*** : 29490200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

ROOFTOP GARDENS

RESOURCE MANUAL FOR MUNICIPAL POLICY MAKERS IN SUPPORT OF GREEN ROOF INFRASTRUCTURE IMPLEMENTATION

The purpose of this proposed research is to provide a comprehensive planning document that allows municipal policy makers to evaluate the benefits of green roof infrastructure in their communities and design appropriate policies and programs in support of their implementation. The research will result in the publication of a practical resource manual in electronic and hardcopy formats for use by municipal government officials. It will help to inform presentations to municipal officials during the ongoing workshops on green roof infrastructure training and development that CMHC is currently involved with on a national level. It will also serve as a follow-up publication to "Greenbacks from Green Roofs". The document will be available in fall 2005.

CMHC Project Officer : *Sandra Marshall*	***CIDN*** : 31730200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	***NEW***

SENIORS

ADAPTING BUNGALOWS FOR SENIORS' HOME CARE: A POST-OCCUPANCY EVALUATION

This research project consists of a post-occupancy evaluation of suburban bungalows that were redesigned for seniors receiving health care services at home. This study aims for the production of an illustrated report compiling typical life stories, combining the day-to-day experiences of the seniors, the comments of the caregivers and the characteristics of the homes.

CMHC Project Officer : *Luis Rodriguez*	***CIDN*** : 26470210
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

DETERMINING THE IMPLICATIONS OF THE AGING OF THE CANADIAN POPULATION FOR HOUSING AND COMMUNITIES

The objective of this project is to examine the specific implications of the aging of the Canadian population for housing and communities. The research will be based on existing data and literature, new practical information from experts and key informants in communities, and case studies of communities that have already reached the proportions of seniors that Canada is expected to have over the next 30 years. The emphasis will be on identifying the challenges and opportunities for planning, designing and managing communities (i.e. cities, small towns and suburbs) with increasing older populations. While the project will deal with a range of issues, the main focus will be on urban form and housing. Other related issues, such as transportation, will have a secondary focus.

CMHC Project Officer : *Luis Rodriguez*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 27420200
STATUS : Ongoing

DEVELOPMENT OF CURRICULA AND SEMINAR MODULES FOR NEW AND EXPANDED CONSTITUENCIES

The objective of this project is to examine the information needs of new audiences for the Seniors Seminars, e.g.: municipalities, at staff and political levels; Aboriginal communities; provincial and territorial governments whose growing population of seniors merit attention to design and living arrangements for this segment, and; seniors themselves. It will develop a plan to produce curricula and training materials for new seminars. The project will include a feasibility study on delivery to the new audiences and identify strategies on marketing the seminars and securing delivery venues in partnership with these groups. This work will be coordinated with work in the project "Re-evaluation and Enhancement of Existing Senior Seminar Modules".

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30370200
STATUS : Ongoing

DEVELOPMENT OF TRAINING MODULES AND CURRICULUM ON HOUSING FOR SENIORS AND PEOPLE WITH DISABILITIES FOR THE ARCHITECTURAL PROFESSION AND EDUCATION INSTITUTIONS WITH CONSTRUCTION-RELATED PROGRAMS

The objective of this project is to identify the most effective techniques for the development and delivery of seminars on seniors' housing for architects, architectural technologists, and other building and design professionals.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 26780200
STATUS : Ongoing

HOUSING OPTIONS STUDY FOR OLDER ADULTS IN THE REGION OF PEEL

The purpose of the research project is to gather data on housing preferences and needs of older adults in the Region of Peel aged 55 years and older. There are three main goals of the research project:

1) To develop, distribute and analyse responses to a survey that captures the key areas of information required;

2) To facilitate focus groups to obtain required housing needs and preference information;

3) To develop an appropriate approach to obtain required housing needs and preference information from older adults who are identified as being isolated.

***CMHC Project Officer* :** *Brett C Barnes*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30390200
STATUS : Ongoing

A LEGAL FRAMEWORK FOR SUPPORTIVE HOUSING FOR SENIORS: OPTIONS FOR CANADIAN POLICY MAKERS: FINAL REPORT

This report considers a range of approaches to the regulation of supportive housing for seniors. These approaches take into account the special hybrid quality of supportive housing as housing with services and the particular needs of seniors, especially at the high "assisted living" end of the supportive housing range. The methodology for the research included a review of literature and legislation in Canada, the United Kingdom, United States, and Australia; consultation with seniors and with professional stakeholders; an evaluation of potential approaches to regulation and possible options to supplement or support regulation (including a National Working Group on Supportive Housing to create best practices guidelines, a Supportive Housing Centre of Excellence, elder ombudsmen, and an information database and seniors' hotline). The Report is intended to serve as an information resource for Canadian policy makers and others concerned with supportive housing for seniors.

Prepared by: Canadian Centre for Elder Law Studies. Principal Investigator: Margaret Isabel Hall. CMHC Project Manager: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2005. (External Research Program Research Report) 155 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre and Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/CHIC%20Legal%20Framework(w).pdf

LIFE LEASE SUPPORTIVE HOUSING: COMBINING THE BEST ASPECTS OF HOUSING AND COMPLEX CARE

The Laurier House model of care is an innovative approach that delivers, in a condominium-like setting, the level and type of healthcare and social services that are traditionally available only in long-term care institutions. The model offers a life lease arrangement, which provides:

- Seniors the advantage of "home ownership" and enables them to occupy a more spacious suite than long-term care institutions provide
- The developing agency, through the sale of life leases, the ability to quickly recapture its investment in the building
- The Alberta government a new publicly-owned facility equivalent to a long-term care institution, which was built without any government investment
- A new way of meeting the needs of frail elderly persons who do not want to move into an institutional setting

This study examined the attitudes toward life lease housing of Laurier House clients, their families, and the professionals whom seniors consult when they require long-term care. The results provided insights into the concerns and values that both seniors and their families hold regarding life-lease agreements and condominium-style living. The model appealed equally well to both the client group who were married and did not wish to be separated from a spouse, and the client group seeking more space and privacy.

Principal investigator: Dr. Doris L. Milke, Research Coordinator, The CAPITAL CARE Group. Team members: Dr. Charles H.M. Beck, Connie F. Wark, and Corinne Schalm. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 2005. (External Research Program Research Report) Volume 1 (85 pages) Volume 2 (188 pages)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre and for Volume 1:
Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/Doris%20Milke%20-%20Final(WEB).pdf

and for Volume 2:
Ftp://ftp.cmhc-schl.gc.ca/chic-ccdh/Research_Reports-Rapports_de_recherche/eng_unilingual/(web2).pdf

MARKET FOR SENIORS' HOUSING IN THE PRAIRIES

This project's objective is to investigate short-term to long-term demographic trends in the Prairies to determine the demand for senior housing. It will also evaluate the current supply of seniors' facilities, their location, costs and basic amenities.

CMHC Project Officer : *Brian Hollohan*
Division : Market Analysis Centre
AVAILABILITY : Product is not yet available

CIDN : 23031000
STATUS : Ongoing

PILOT IMPLEMENTATION AND DELIVERY OF REVISED SENIORS SEMINARS TO NEW AND EXPANDED AUDIENCES

This project flows from the key main objectives originally established for the Seniors Seminars project, i.e. :
a) To increase awareness of CMHC as the Federal government's housing agency and as a major source in Canada of research and knowledge on seniors' housing issues;
b) To increase awareness in the community of the range and type of seniors' housing options that can be made available;
c) To heighten knowledge and take up of CMHC Assisted Housing Programs targeted to seniors and persons with disability (RRAP-D. HASI, Canadian Centre for Public-Private Partnerships in Housing).

The methodologies for meeting project objectives will be:
a- arranging pilot seminar venues and partnership agreements with host organizations;
b- promoting the pilot seminars, marketing to key client groups;
c- locating and engaging seminar presenters and animators, who will be both external contractors and CMHC personnel.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 30380200
STATUS : Ongoing

PROJECTING THE HOUSING NEEDS OF AGING ATLANTIC CANADIANS

This research will examine the current housing and support service needs of Atlantic seniors at both the provincial and regional levels and, based on these, will generate new and valuable insights. The research team is being led by Mount Saint Vincent University with the collective efforts of a research alliance of 37 members encompassing all four Atlantic Provinces, and representing universities, seniors organizations, housing developers, service providers, and government departments. Funding has been provided by the Social Sciences and Humanities Research Council through the Community-University Research Alliance Program. Funding contributions have also been made by Canada Mortgage and Housing Corporation, the Nova Scotia Department of Community Services, Mount Saint Vincent University, Dalhousie University, University of New Brunswick and the University of Prince Edward Island.

CMHC Project Officer : *Luis Rodriguez*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 29520200
STATUS : Ongoing

RE-EVALUATION AND ENHANCEMENT OF EXISTING SENIOR SEMINAR MODULES

This project is intended to:
a- follow-up and action the evaluative comments and suggestions for enhancement to modules provided by seminar participants, by the team of presenters during the post-pilot phase debriefings and the retrospective observations made by the project consultant who provided feedback through the workshop evaluations done at most sessions;
b- integrate CMHC research results into the modules to make them more useful to expanded client groups, especially those with more technical educational needs;
c- undertake objectives (a) and (b) in light of the findings, conclusions and recommendation expected to result from the project on consulting new and expanded constituencies.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available
CIDN : 30360200
STATUS : Ongoing

RENOVATION AND REPAIR ADVISORY SERVICES FOR HOMEOWNERS/SENIORS

The final report resulting from this research will discuss renovation/repair advisory services for homeowners/seniors. Drawing from consultations with housing industry members from across Canada, and information gathered from other countries, particularly the U.S and the UK, the report will identify benefits and drawbacks of developing a renovation/repair advisory service that could be modelled across Canada.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available
CIDN : 26470203
STATUS : Ongoing

SEMINARS ON SENIORS' HOUSING FOR THE RESIDENTIAL CONSTRUCTION AND HEALTH CARE SECTORS

This project's objective is to develop and undertake delivery of seminars on seniors housing for professionals in the Canadian residential and home care sectors. The project was developed to disseminate the results of CMHC's research, programs and other relevant information concerning seniors housing.

This project entails eight separate modules on different aspects of seniors housing. By year-end 2004 some 45 seminars/presentations were delivered at over 30 events. Evaluation results indicate a very high degree of satisfaction with the seminars and participants indicated they have used or plan to use the information gained at these events. The seminars project is ongoing, with a focus on the health and home care industry, architects and home builders. New audiences will also be sought, e.g. seniors organizations.

CMHC Project Officer : *Jim Zamprelli*
Division : Policy and Research Division
AVAILABILITY : Seminar/training is available

CIDN : 23820200
STATUS : Ongoing

SENIORS' HOUSING FOR SENIORS - A FEASIBILITY STUDY

The objective is to undertake a pilot study in the City of Ottawa to determine the interest of seniors (55+) who are owner occupiers in subdividing their housing units into multiple units and the feasibility (financially and architecturally) of doing so. The project is in line with the City's official plan to match housing developments with demographic requirements as well as to intensify and diversify residential development (Ottawa, 2003). The study also addresses the goal of Aging in Place (i.e., enabling seniors to remain independent in their homes for as long as possible). There are three basic research questions:

1) are senior owner occupiers interested in converting their single family homes into multiple units for their own use and the use of others including seniors?

2) among owner occupiers who are interested in conversion, what are the financial and architectural implications of conversion? and

3) what regulatory and zoning changes are required to accommodate the conversion of senior single family units into multiple units?

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 28370204
STATUS : Ongoing

SOCIAL HOUSING

SOCIAL HOUSING IN THE CONTEXT OF RURAL DEPOPULATION

Increasing numbers of public and social housing projects are located in areas of rural depopulation which are losing their service infrastructures. This results in housing projects being "stranded" in communities which are becoming service-poor. The people in the "stranded" projects are often seniors who must face decreasing access to necessary social and health services/facilities. This project entails an assessment of the scope of the problem and includes case studies of communities/social housing managers who have experimented with "best practices" in dealing with the challenge.

CMHC Project Officer : *Anna Lenk*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 26570200
STATUS : Ongoing

SUSTAINING THE NON-PROFIT HOUSING SECTOR IN BRITISH COLUMBIA

Affordable, secure and safe housing contributes to the well being of Canadian households and promotes the growth of stable communities. The non-profit housing sector in British Columbia is making a key contribution in that regard by managing a variety of significant housing portfolios across the province. The sector currently faces a range of operational issues including uncertainty about its future sustainability. In light of those conditions, the sector is aware that it must develop long-term management strategies that maximize the utility of its available resources, now and for the future, and thereby help to ensure that it is able to continue to operate over the long term.

This study describes the size and complexity of the sector and uses that overview as part of the context within which to consider:

- the current management performance of the sector;
- the problems/successes it is experiencing;
- its attitudes towards those problems/successes; and
- the options for improvement available to it.

Areas of particular interest include:

- consolidation and rationalization of common services or functions using shared service delivery models;
- increased cooperation among societies ranging from information exchange to joint business ventures to collaborative initiatives; and
- expansion of the scope and effectiveness of volunteerism.

Prepared by Marason Management Limited in partnership with the BC Non-Profit Housing Association. CMHC Project Officer: Stephen G. Hall. Ottawa: Canada Mortgage and Housing Corporation, 2004.

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

CITY OF YORKTON DOWNTOWN REDEVELOPMENT PLANNING CHARRETTE

The Downtown Redevelopment Charrette was hosted by the City of Yorkton from October 28th – 30th of 2004, to generate buildable and sustainable plans for a 12.1 hectare (30 acre) brownfield site located in the heart of the City. The aim was to discover what types of development would revitalize the Downtown Core and be supported by the community?

The multi-day, multi-disciplinary working session explored various design options related to sustainable development, urban design, land use scenarios, site planning principles and architectural details. Free from most planning constraints, teams designed the Study Area how they saw fit. Dense mixed-use developments, sustainable housing options, area amenities and community-sensitive elements were incorporated into the Study Area. With the aid of various professionals, participants created development solutions that addressed the future of Downtown Yorkton.

Sustainability was a focal point on the agenda. The Charrette helped foster community ownership and commitment towards sustainable strategies that integrated economic, social and environmental development objectives. By linking the short term goals of viable transportation planning with the long term goals of responsible development ideas, for example, energy-efficient housing, the City of Yorkton can plan for *existing* generations without impeding the growth of *future* generations.

Designs generated throughout the integrated design process will contribute to achievable plans for the future redevelopment of the Study Area, and ultimately the reinvestment for the City of Yorkton. The degree of commonality in plan designs reflected the community consensus for land use planning in Yorkton and the benefits of having a well thought-out, well-supported community vision.

Prepared by City of Yorkton. CMHC Project Officer: Cynthia Rattle. Ottawa: Canada Mortgage and Housing Corporation, 2005. 31 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

COMMUNITY PLANNING AND DESIGN CHARRETTES

This project will contribute to design charrettes in several possible ways including participation in charrettes, financial support towards costs to retain a consultant or to cover logistical expenses. A community planning and design charrette was held for the West Hills residential subdivision in the City of Fredericton, New Brunswick in July, 2004. The purpose of the charrette was to develop sustainable visions for the subdivision. CMHC provided financial support, engaged a consultant to plan, deliver and document the charrette, and participated in the charrette. Documentation of the results of the charrette is underway.

CMHC Project Officer : *Cynthia Rattle*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 31740200
STATUS : Ongoing

IMPACT OF HOUSING CHOICES: CONSUMER INFORMATION ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to analyze demographic, housing, transportation and energy data and to develop a consumer-oriented information product comparing the impact of various housing choice scenarios, each with different community planning patterns. Users of this web based product will be able to select among five Canadian cities. In each city, five typical neighbourhood development patterns and locations within the urban context will be described, highlighting issues such as private vehicle use, access to daily destinations and availability of private space. The research has been completed and a web-based information product is currently in production.

CMHC Project Officer : *Susan Fisher*
Division : Policy and Research Division
AVAILABILITY : Product is not yet available

CIDN : 22800200
STATUS : Ongoing

MARKET TRANSFORMATION OF GREEN COMMUNITY DESIGN AND RESIDENTIAL HOUSING IN THE CITY OF VAUGHAN

This research will develop a local action plan for increasing the adoption of best practices in green community design and green residential housing construction in the City of Vaughan, Ontario. The project will create a framework of best practices in green community design and green residential housing construction and benchmark the current state of best practices in the City. Barriers to and levers for promoting more extensive market penetration of best practices will be defined and a plan will be created for accelerating and monitoring the use of best practices within the City.

The project is being carried out as part of the Toronto and Region Conservation Authority's Living City Centre program.

CMHC Project Officer : *Cynthia Rattle*	***CIDN*** : 28370220
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

RETROFIT OPPORTUNITIES FOR GREYFIELD REDEVELOPMENT IN SMALL AND MEDIUM SIZE ONTARIO CITIES

The research project will explore the issue of greyfields redevelopment. The two research methods for this project will include a literature review and case study work. Emphasis will be given to the latter method so as to provide tangible examples of how this approach to planning and development can feasibly be put into practice. The final report has been received and the ten case studies are in production.

CMHC Project Officer : *Mark Holzman*	***CIDN*** : 30620200
Division : Policy and Research Division	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

SITE CONTROL FOR SUSTAINABLE COMMUNITY DEVELOPMENT

This External Research Program project will:

- review relevant literature pertaining to market mechanisms for sustainable community development, with particular attention to site control and land assembly and provide case study examples of where they have been used;
- develop two detailed case studies of examples in BC where market mechanisms have been attempted (e.g., Community Development Corporations, Community Land Trusts) successfully, as well as cases where no mechanisms were in place;
- articulate the elements of existing market mechanisms that could be used for site control for sustainable community development in the Canadian context;
- identify barriers and obstacles within the Canadian policy context for these mechanisms; and
- identify and recommend strategies and processes for overcoming these obstacles.

CMHC Project Officer : Fanis Grammenos	***CIDN*** : 28370213
Division : External Research Program	***STATUS*** : Ongoing
AVAILABILITY : Product is not yet available	

SMART GROWTH IN CANADA: IMPLEMENTATION OF A PLANNING CONCEPT

This project will do a critical assessment of the smart growth movement by attempting to find answers to the following questions: Which cities in Canada have made genuine efforts to adopt the new approach and alter their development patterns in a fundamental way? What successes have these cities experienced and where have they failed? What are the reasons behind both successes and failures? And what are the lessons we can draw for the viability of the new approach in the Canadian context? To address these questions, six Canadian municipalities will be selected in different jurisdictions, of varying sizes, that have a reputation of being leaders in smart growth. The project will look at what they have proclaimed as their goals and policies, and will evaluate, through an in-depth case study approach (reviewing planning documents, collecting statistics, interviewing relevant officials), what they have actually done to implement the stated goals and what they have achieved "on the ground".

***CMHC Project Officer* :** *Fanis Grammenos*
Division : External Research Program
AVAILABILITY : Product is not yet available

CIDN : 26470208
STATUS : Ongoing

SUSTAINABILITY, PLANNING PRACTICE, HOUSING FORM AND ENVIRONMENTAL PROTECTION IN THE TORONTO REGION'S OAK RIDGES MORAINE: PROJECT REPORT

Over the last decade the Toronto region has seen some of the most significant urban growth in North America. In particular, housing development has emerged as an enduring symbol of the urbanization of the region's landscape. But growth has not occurred without controversy. In the Oak Ridges Moraine area, along Toronto's northern edge, housing developments became catalysts for activism, changes in local government, and a rethinking of urban and housing form.

The Oak Ridges Moraine (ORM) is an environmentally important area stretching east/west about 160 km. The Moraine extends through some of the most urbanized portions of the Great Lakes region. The ORM area has experienced extensive growth pressure. Recent applications for large housing developments were subject to opposition from local governments, conservation groups and the public at large. Growth along the Moraine has emerged as a significant regional and provincial political issue – it has also subjected Ontario's planning system to new levels of scrutiny and critique. While the Province of Ontario's recently implemented Oak Ridges Moraine Conservation Plan may slow the pace of sprawl in the Moraine area, several large developments will continue, and the Plan does not address planning and growth challenges in adjacent areas.

This research provides an analysis of the Moraine's housing legacy, and examines the planning options available to support both sustainable community growth and housing development. Two broad central questions are considered. How have the prevalent housing trends in the ORM area contributed to recent planning challenges and conflicts? And within a growth context, how can sustainability objectives and healthy housing form be achieved in the ORM region, and potentially other urban settings?

The research is based on document analyses, interviews with participants in the planning and policy processes, and a geospatial analysis of change in three Moraine communities. This study emphasizes the importance of linking growth management, housing, and planning practice. The research results provide knowledge about trends and options for advancing environmentally healthy and sustainable housing.

Prepared by Kevin Hanna and Steven Webber. CMHC Project Manager: Mark Holzman. Ottawa: Canada Mortgage and Housing Corporation, 2005. (External Research Program Research Report) 137 pages

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre

CMHC RESEARCH REPORT LISTINGS

To provide quick and comprehensive access to CMHC research published on a given topic, the Canadian Housing Information Centre compiles comprehensive listings of housing research produced over a number of years on certain topics. Topics chosen are those for which there is ongoing client interest and/or for which CMHC has published considerable research. To obtain an electronic, faxed or mailed copy of any of the lists below, contact the Canadian Housing Information Centre at: 1-800-668-2642 or e-mail us at: chic@cmhc.gc.ca

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- Aboriginal Housing
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- Heating and Ventilation
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- Moisture Problems
- Mortgages and Housing Finance
- Northern Housing
- Rental Housing
- Residential Construction Waste
- Residential Renovation
- Self Help Housing
- Social Housing
- Straw Bale Housing
- Sustainable Development
- Water Conservation, Reuse and Management

ABOUT YOUR HOUSE SERIES

Fact sheets on common housing questions, issues and problems.

These documents are available in HTML and Adobe Acrobat format (pdf) on the CMHC web site at: http://www.cmhc-schl.gc.ca/en/burema/gesein/abhose/abhose_060.cfm

Print copies can be obained by calling 1-800-668-2642

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60360	CE 12	**Tips for Post-storm Tree Care** Practical pruning advice to restore the health and shape of trees damaged by ice or wind storms. Aussi disponible en français sous le titre : Le soin des arbres après la tempête
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ABOUT YOUR HOUSE SERIES

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62041	CE 22	**Your Furnace Filter** To reduce exposure to airborne particles, choose the furnace filter that best suits your needs. Aussi disponible en français sous le titre : Le filtre de votre générateur d'air chaud

Order no.	Series no.	Title
62042	CE 23	**Water-Saving Tips for Your Lawn and Garden** Often water is applied inefficiently, resulting in significant waste due to over watering, evaporation or run-off. Here are some general watering tips to avoid such waste. Aussi disponible en français sous le titre : Comment entretenir vos pelouses et jardins en économisant l'eau
60417	CE 24	**Backup Power for Your Home** The top ten tips in choosing the appropriate backup system to provide electricity to your home in the event of a prolonged power failure. Aussi disponible en français sous le titre : Alimentation de secours pour votre maison
62046	CE 25	**Carbon Monoxyde** A list of questions and answers dealing with keeping Carbon Monoxide out of your home and to help you choose the right CO detector. Aussi disponible en français sous le titre : Le monoxyde de carbone
62277	CE 26a	**Hiring a Contractor** How do you find the "right" contractor for you? What should go in a contract? What are liens, holdbacks and completion certificates? Make sure you get what you want and pay for when hiring a contractor. Aussi disponible en français sous le titre : Le Choix d'un entrepreneur
62351	CE 26b	**Sample Renovation Contract** A detailed written contract between you and the contractor you hire is essential to any renovation or home repair project, no matter its size. Aussi disponible en français sous le titre : Modèle de contrat de rénovation
62045	CE 27	**Choosing a Dehumidifier** Air that is too damp can cause condensation on windows, water damage to materials, mold and even wood rot. Choose the right dehumidifier to regulate the humidity in your home. Aussi disponible en français sous le titre : Le Choix d'un déshumidificateur
	CE 28	**The Renovation Project (12 parts)**
		This series will assist you in making informed decisions before you renovate. Each easy-to-read fact sheet helps you ask the key questions, reviews the available options and discusses the consequences if certain aspects of the renovation are overlooked. Advance planning is the key to successful renovations. These fact sheets help you plan, assess, and avoid surprises. Achieve the results you want by doing your renovation right the first time.

Order no.	Series no.	Title
62246	CE 28a	**Assessing the Renovation Project** Before renovating, it's important to assess your home's current condition to determine if there are significant problems that you must deal with before or during the renovation project. Aussi disponible en français sous le titre : Évaluation du projet de rénovation
62248	CE 28b	**Renovating your Basement - Structural Issues and Soil Conditions** Renovating a basement can add value and extra living space to a home. Fixing foundation problems before renovating is essential to preserve the durability and structure of the house. Aussi disponible en français sous le titre : Rénovation du sous-sol - Aspects structuraux et conditions du sol
62250	CE 28c	**Renovating Your Basement - Moisture Problems** Is there condensation on the basement windows? Are there white chalky stains on the foundation? Do the carpets smell musty? Creating a clean, dry and healthy living space is a critical first step. Aussi disponible en français sous le titre : Rénovation du sous-sol - Problèmes d'humidité
62252	CE 28d	**Renovating Your Kitchen** The kitchen is often the most used room in the house and kitchen renovations typically have the highest financial payback. Conduct a pre-renovation inspection and prioritize the most desirable features for your new kitchen. Aussi disponible en français sous le titre : Rénovation de la cuisine
62254	CE 28e	**Renovating Your Bathroom** Bathroom renovations offer the second highest financial payback rate and are one of the most common home improvement projects. Use this fact sheet to check for problems before you renovate. Aussi disponible en français sous le titre : Rénovation de la salle de bains
62256	CE 28f	**Window and Door Renovations** Do you want more natural light in your living area? Are you concerned about security? Before repairing or replacing windows and doors, consider all of the factors outlined in this fact sheet. Aussi disponible en français sous le titre : Nouvelles portes et fenêtres

Order no.	Series no.	Title
62258	CE 28g	**Repairing or Replacing Roof Finishes** Regular maintenance and periodic roof inspections will identify problems before they cause costly damage to your home. Learn about the key factors that will determine whether you should repair or replace your roof. Aussi disponible en français sous le titre : Réparation ou remplacement de la couverture
62260	CE 28h	**Repairing or Replacing Exterior Wall Materials** Exterior finish materials must prevent rain and snow from penetrating the building and causing moisture damage. Repairing or replacing exterior wall finishes will protect and preserve the durability and structure of the home. Aussi disponible en français sous le titre : Réparation ou remplacement du revêtement des murs extérieurs
62262	CE 28i	**Energy Efficient Upgrade - Mechanical Systems** Upgrading the heating, cooling and ventilation (HVAC) equipment is the best way to create a healthy, comfortable and less expensive home to operate. Before altering these, it is important to understand how the overall performance of the house will be affected. Aussi disponible en français sous le titre : Améliorations éconergétiques - installations mécaniques
62264	CE 28j	**Energy Efficient Upgrade - The Building Envelope** The envelope, or outer layer, of your house separates living space from the outdoor elements. Improving it can result in a better insulated, more airtight home that is easier to heat. Aussi disponible en français sous le titre : Améliorer l'efficacité énergétique - L'enveloppe du bâtiment
62266	CE 28k	**Assessing the Comfort and Safety of Mechanical Systems** The heating, ventilating and air conditioning (HVAC) systems are a vital part of your home. Ensure that your mechanical systems are operating safely and efficiently. Aussi disponible en français sous le titre : Évaluation de vos installations mécaniques - confort et sécurité
62268	CE 28L	**A New Addition** Before building an addition, clearly identify the features you need and inspect the current structure and mechanical systems to be sure they can support the new addition. Aussi disponible en français sous le titre : Une nouvelle annexe

Order no.	Series no.	Title
62044	CE 29	**Should you get your Heating Ducts Cleaned?** Should you get your heating ducts cleaned? Will clean ducts result in improved air quality? When is duct cleaning most appropriate? This fact sheet separates fact from fiction. Aussi disponible en français sous le titre : Doit-on faire nettoyer les conduits de chauffage?
63322	CE 30	**Water Damage, Mold and House Insurance** You've had water damage in your house due to a burst pipe, a roof leak, or a heavy summer storm. You hope that your insurance will cover the damage. What to do? Aussi disponible en français sous le titre : Moisissure, dommages causés par l'eau et assurance habitation
62226	CE 31	**Understanding and Dealing with Interactions Between Trees, Sensitive Clay Soils and Foundations** Is the size, type or siting of a tree affecting your foundation? Understanding the interactions between trees, soils and the foundation can help you avoid foundation shifting, cracks and other damage. Aussi disponible en français sous le titre : Comprendre l'interaction des arbres, du sol d'argile sensible et des fondations et agir en conséquence
62288	CE 33	**CMHC Garbage Bag Airflow Test** This simple test uses an ordinary garbage bag to help you estimate airflow from your furnace registers, bathroom exhaust fan or clothes dryer exhaust. Aussi disponible en français sous le titre : Essai de mesure du débit d'air à l'aide d'un sac à ordures
62795	CE 34	**Your Septic System** A primer on the components, operation and proper maintenance of an in-ground septic tank and system. Aussi disponible en français sous le titre : Votre installation d'assainissement
62839	CE 35	**Hiring a Home Inspector** One of the best ways to understand about a home's condition, habitability and safety is to hire a professional home inspector. Aussi disponible en français sous le titre : Le Choix d'un inspecteur en bâtiment
62341	CE 36	**The Condominium Owners' Guide to Mold** Special advice for identifying and removing mold in a condo, and solving the problems that cause it. Aussi disponible en français sous le titre : Guide sur la moisissure à l'intention des copropriétaires

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
62935	CE 39	**Buying a Toilet** Advice and tips on what to look for when buying a toilet. Aussi disponible en français sous le titre : L'achat de toilettes
63319	CE 40	**Buying a House with a Well and Septic System** Information on what to inspect and test if a property has a well and/or septic system. Includes checklists for potential buyers. Aussi disponible en français sous le titre : L'achat d'une maison avec un puits et une installation septique
62953	CE 41A	**UV Water Treatment** Describes the ultra-violet light water treatment process, and the pros and cons of using such a system. Aussi disponible en français sous le titre : Traitement de l'eau aux rayons ultraviolets (UV)
62898	CE 41B	**Water Distillers** Everything you ever wanted to know about water distillers from how they work to how to install and maintain them. Aussi disponible en français sous le titre : La distillation de l'eau
62896	CE41C	**Water Filters** Consumer series of household water treatment options. Water filters are an inexpensive method of additional water treatment. Some filters can remove certain contaminants such as lead. Aussi disponible en français sous le titre : Filtres à eau
62946	CE 41D	**Water Softeners** Find out how a water softener works and obtain information on whether you should consider installing one. Aussi disponible en français sous le titre : Les adoucisseurs d'eau
62962	CE 41E	**Reverse Osmosis Water Treatment** Describes the reverse osmosis water treatment process, and provides the pros and cons of using such a system. Aussi disponible en français sous le titre : Filtration de l'eau par osmose inverse
62966	CE 42	**Canada's Construction System** The purpose of this document is to foster understanding of the elements of the system of construction and operation of buildings and houses in Canada. Aussi disponible en français sous le titre : Système de construction canadien

ABOUT YOUR HOUSE SERIES

Order no.	Series no.	Title
63890	CE 43	**Photovoltaics (Pvs)** Consumer information piece presenting information on solar electric (photovoltaic) systems for housing Aussi disponible en français sous le titre : Les systèmes photovoltaïques
63134	CE 44	**Painting: Walls, Ceilings and Floors** This factsheet provides general information on: selecting paints, e.g. latex (water based) or alkyd (oil based); types of paint and paint finishes, e.g. low or high sheen, sealer, primer, melamine; estimating quantity of paint required; preparing for painting; and painting tips. Aussi disponible en français sous le titre : La peinture : murs, plafonds et Planchers.
63144	CE 45	**Flooring Choices** A quick summary of the advantages, considerations, installation, maintenance, and costs to think about when choosing resilient, laminate, and wood flooring, as well as carpet and ceramic tile. Aussi disponible en français sous le titre : Les revêtements de sol
63349	CE 46	**Fighting Asthma in Your Home** Practical tips to help people with asthma improve the indoor air quality of their home. Aussi disponible en français sous le titre : Combattre l'asthme à la maison
63218	CE47	**Home Maintenance Schedule** This factsheet provides a listing of the regular home maintenance tasks which should be done at various times throughout the year to protect the condition of your house. Aussi disponible en français sous le titre : Calendrier d'entretien de votre maison
63227	CE48	**Replacing Your Furnace** This fact sheetprovides information for consumers who are replacing their existing furnace with a new one. It deals with fuel choice, furnace selection, and furnace sizing. Aussi disponible en français sous le titre : Le remplacement d'un générateur de chaleur
63235	CE 49	**Getting Your House Ready to Sell** Tips for homeowners who wish to get their house ready to sell. Aussi disponible en français sous le titre : Ce qu'il faut faire avant de mettre votre maison en vente

Order no.	Series no.	Title
63436	CE50	**Avoiding Basement Flooding** Basement flooding leads to damage of the finishing material and possible growth of mold. This document reviews why basements flood and how to prevent floods from occurring. Aussi disponible en français sous le titre : Comment prévenir les inondations de sous-sol
63486	CE51	**Get to Know Your Soil** This fact sheet provides practical tips on how to analyse soil so that you can select the plants that are suited to the soil you have on your property. Once you have determined the soil conditions, it provides tips on how to amend it, if needed. Aussi disponible en français sous le titre : Apprenez à connaître votre sol
63488	CE52	**Low-Maintenance Lawns** Low-maintenance lawns help to reduce the time, costs, water, pesticides, fertilizer and energy used to maintain lawns. This fact sheet describes the benefits and provides practical tips on how to install and maintain low maintenance lawns, including species selection. Aussi disponible en français sous le titre : Les pelouses à faible entretien
63490	CE53	**Rain Gardens: Improve Stormwater Management in Your Yard** Rain gardens are landscaped areas designed to receive stormwater and allow it to infiltrate into the soil. This fact sheet describes the benefits and provides practical tips on how to install and maintain gardens. Aussi disponible en français sous le titre : Un jardin pluvial pour mieux gérer les eaux de ruissellement dans votre cour
63492	CE54	**Understanding Your New Home Sales Contract** This factsheet provides information on some of the terms and provisions that you may find in a new home sales agreement to illustrate what a contract can cover and an explanation why. Aussi disponible en français sous le titre : Comprendre le contrat de vente de votre maison neuve
63495	CE55	**Selecting A New Home Builder** This factsheet provides information on how to find and what to look for and consider when searching for the right builder to build your new home. Aussi disponible en français sous le titre : Le choix d'un constructeur d'habitations

Order no.	Series no.	Title
63637	CE56	**Preventing Falls on Stairs** This fact sheet tells you about some of the ways you can reduce the risk of falling on or from residential stairs. Aussi disponible en français sous le titre : Comment prévenir les chutes dans les escaliers
63730	CE57	**Efficient, Convenient Wood Heating** This is a short guide to the proper use of woodburning appliances in homes: what appliances to choose, how to operate them efficiently, what wood to burn, how to cut and store it, etc. Aussi disponible en français sous le titre : Le chauffage au bois pratique et efficace
63683	CE58	**The ABC's of Windows** This document will help consumers understand and select window performance levels with respect to airtightness, rain penetration and wind resistance appropriate for their climatic (and geographical) location and exposure conditions Aussi disponible en français sous le titre : L'ABC des fenêtres
63911	CE59	**Should You Test the Air in Your Home for Mold** Testing the air in their home or apartment for mold is usually the first thing many people ask for when they suspect the presence of mold or have discovered mold growth. This fact sheet explains why air testing is not recommended, why an investigation by a trained professional is more useful and what to do if testing is deemed necessary Aussi disponible en français sous le titre : Faut-il faire analyser l'air de la maison pour déceler la présence de moisissures?
63822	CE60	**What to Do After a Fire** Protect your health and prevent further damage to your home by following this detailed guide on the steps to restore your home after a fire. Aussi disponible en français sous le titre : Que faire après un incendie

ABOUT YOUR APARTMENT SERIES

63419	AE1	**Solving Odour Transfer Problems in Your Apartment** One of the most common problems experienced by the occupants of apartment buildings is the transfer of objectionable odours from one apartment to another. Tobacco smoke and cooking odours top the list of complaints. This fact sheet explains how odours are transferred, and offers a number of potential solutions. Some are very easy to implement and others should be done with the agreement of the building management. Some are trial and error. Solving the problem can take perseverance. Aussi disponible en français sous le titre : Enrayez la transmission d'odeurs dans votre appartement
63904	AE2	**Reducing Noise in Your Apartment** This article provides basic information about the behaviour of sound and noise and suggests ways to improve the peace and tranquility in your apartment or condominium Aussi disponible en français sous le titre : Atténuation du bruit dans votre appartement

ABOUT YOUR HOUSE - **NORTH SERIES**

VOTRE MAISON - **DOSSIER DU NORD**

The North About Your House series is a series specifically designed around day to day northern solutions as well as innovative northern models of building practices which work under cold climate conditions. In this series you will find examples of how to use structural panels in the high arctic, means to cleanse wastewater in the North as well as demonstrated ways of constructing a roof which can withstand northern conditions and how to choose a foundation system which will work in any of the northern communities.

Order no.	Series no.	Title
62303	North Series 1	Building with Structural Panels -- Repulse Bay
62304	Dossier du Nord	Maison à panneaux isolants de construction à Repulse Bay
62295	North Series 2	On-site Wastewater Reclamation Systems for the North
62297	Dossier du Nord 2	Installations de recyclage sur place des eaux usées dans le nord
62329	North Series 3	Snowshoe Inn, Fort Providence Co-generation Model
62330	Dossier du Nord 3	Modèle de cogénération du Snowshoe Inn, Fort Providence
62298	North Series 4	Residential Foundation Systems for Permafrost Regions
62299	Dossier du Nord 4	Fondations pour les bâtiments résidentiels construits sur le pergélisol
62154	North Series 5	Eagle Lake Healthy House
62155	Dossier du Nord 5	La maison saine d'Eagle Lake
62313	North Series 6	Arctic Hot Roof Design
62314	Dossier du Nord 6	Conception de toits chauds pour climat arctique
63050	North Series 8	How to Prevent Plumbing and Heating Vent Stack Freeze-up
63051	Dossier du Nord 8	Prévenir le gel des colonnes de ventilation de plomberie et des conduits d'évacuation de l'appareil de chauffage
63394	North Series 9	Fancoil Integrated Combination Heat and Domestic Hot Water Systems
63395	Séries du Nord 9	Installation de chauffage des locaux et de l'eau intégrée à un ventilo-convecteur

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Brief descriptions of CMHC research papers you may wish to obtain.

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http://www.cmhc-schl.gc.ca/publications/en/rh-pr/index.html

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Order no.	Series no.	TITLE
63945	05-107	Fire Experience, Smoke Alarms and Sprinklers in Canadian Homes: CMHC Research to 2005
63876	05-105	Testing the Adhesion of Air- Barrier Membranes in Wall Assemblies
63848	05-104	Ice Damming Field Research
63745	04-131	Water Reuse Standards and Verification Protocol
63741	04-130	Dry and Comfortable Floors in Existing Basements
63733	04-128	Dynamic Buffer Zone (DBZ) System Performance
63728	04-127	Comparison of Under-Floor Insulation Systems
63726	04-126	Update of Roof Truss Designs with Nailing Schedules
63641	04-125	Residential Sources of Lead
63677	04-124	Summary of Research on Water Resistive Barriers
63675	04-123	Assessing the Impact of Thickness on the Performance of Stucco Cladding
63673	04-122	Comparison and Analysis of Provincial Builder and Renovator Industry Programs
63635	04-121	Field Testing of "Spillage- Resistant" Appliances
63465	04-119	Diagnosing Attic Performance by Snow- and Frost-Melt Patterns
63620	04-118	Performance of Sprayed Polyurethane Foam on Indoor Foundation Walls
63615	04-117	Analysis of Ventilation System Performance in New Ontario Houses
63612	04-116	Energy Needs and Availability in Housing
63571	04-115	Building Canada: Phase One
63555	04-114	Investigating Claims Against Home and Property Inspectors
63557	04-113	Installation Guide for Residential Wood I-Joist Floor Systems

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Order no.	Series no.	TITLE
63547	04-112	Canadian Home Inspectors and Building Officials National Initiative Phase II: Development of National Certification and Accreditation Models
63528	04-111	Characterizing the Condominium Population of the Greater Ottawa Area, 1969-2002
63540	04-110	Strategies for Reducing Building Energy Use Via Innovative Building Envelope Technologies
63511	04-109	Maximum Performance Testing of Popular Water-Efficient Toilet Models
63542	04-108	Garage Performance Testing
63503	04-107	Survey of In-Suite Space and Domestic Hot Water Heating Systems In Multi-Residential Buildings
63400	04-105	Field Testing of an Integrated Ventilation Space Conditioning System for Apartments
63413	04-104	Practical Measures for the Prevention of Basement Flooding Due to Municipal Sewer Surcharge
63407	04-103	House Dust: A Useful Tool To Assess Microbial Contamination In Homes
63390	04-102	Calgary Integrated Design and Sustainable, Affordable Housing Charrette
63365	04-101	Residential Combustion Spillage Monitoring
63376	04-100	Improved Make-up Air Supply Techniques
63382	03-134	Safe Housing for Lightly Contaminated Lands
63370	03-133	Residential Combustion Venting Failure - A Systems Approach
63374	03-131	The Canadian Residential Duct and Chimney Survey
63326	03-129	Monitoring the Performance of a Retrofitted Preserved Wood Foundation
63333	03-128	Review of Hygrothermal Models for Building Envelope Retrofit Analysis
63328	03-127	Static and Dynamic Earthquake Testing of Rainscreen Stucco Systems for B.C. Residential Wood-Frame Construction
63339	03-125	Water Penetration Resistance of Windows - Study of Codes, Standards, Testing and Certification
63367	03-124	Water Penetration Resistance of Windows : Study of Manufacturing, Building Design, Installation and Maintenance Factors

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Order no.	Series no.	TITLE
63315	03-123	Integrated Community Solutions: Regina's Affordable, Sustainable Housing Design Charrette
63294	03-122	The impact of requiring HVAC system design submittal on system performance
63280	03-121	Ventilation Systems for Multi-Unit Residential Buildings: Performance Requirements and Alternative Approaches
63243	03-119	Reduction of Air Intake Contamination in High-Rise Residential Buildings
63257	03-118	Investigation of a Ground-Source Heat Pump Retrofit to an Electrically Heated Multi-Family Building
63237	03-117	Influence of an Electronic Air Cleaner on Indoor Ozone
63225	03-116	Qualification of the Degree of Acoustic Comfort Provided by Multi-Family Buildings - Phase II
63233	03-115	Case Studies of Major Energy Retrofits
63208	03-114	Technology Roadmap for Intelligent Buildings
63223	03-113	Dawson City Demonstration Monitoring Northern Ventilation
63206	03-112	Guidelines for On-Site Measurement of Moisture in Wood Building Materials
63204	03-111	Comparison of Modeled and Monitored Performance of a Wall Insulation Retrofit in a Solid Masonry Building
63214	03-110	Integrated Design Charrette for a Sustainable UniverCity Community
63200	03-109	Proper Retrofit Furnace Sizing
63188	03-108	Re-Sale of Leaky Condos: Did the Buyer Know?
63194	03-107	Design of Durable Joints Between Windows and Walls
63192	03-106	Cooling Rates of Houses During Extended Power Failures
63190	03-105	Penetration of Outdoor Particles Into a Residence
63186	03-104	Indoor Particulate and Floor Cleaning
63182	03-103	Incompatible Building Materials
63175	03-102	Seville Theatre Redevelopment Project: Integrated Design Process
63172	03-101	Mandatory Home Inspections on Resale Homes in Ontario
63132	03-100	Rain Water Harvesting and Grey Water Reuse
63102	02-137	Multi-Residential High Efficiency Clothes Washer Pilot Project

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

Order no.	Series no.	TITLE
63,065	02-135	Monitored Performance of an Innovative Multi-Unit Residential Building
62,637	02-133	Positive Pressure Ventilation for High-Rise Buildings
63,035	02-132	Alternative Wall Systems for Low-Rise Housing
63,053	02-130	Evaluation of Vapour Diffusion Ports on Drying of Wood-Frame Walls Under Controlled Conditions
63,044	02-129	Investigation Protocol for Evaluation of Post-Tensioned Buildings
63019	02-128	"Northern Landscaping: A Guide to Restoring Plants and Soil in Northern Communities"
63015	02-127	LeBreton Flats District Heating System Performance Assessment
63017	02-125	Healthy Indoors: Achieving Healthy Indoor Environments in Canada
62995	02-124	Dual-Flush Toilet Testing
62997	02-123	Green Roof Infrastructure Workshop
63022	02-120	Study of High-Rise Envelope Performance in the Coastal Climate of British Columbia
62976	02-118	Compliance of Ventilation Systems Installed to Meet Proposed Changes to the 1995 NBCC
63104	02-117	Research Project on the Noise Produced by DWV Pipes Made of Cast Iron, PVC and ABS
62894	02-116	Wood Usage in Straw Bale House Construction
62892	02-115	Energy Use in Straw Bale Houses
62890	02-114	Defining the Convective Driving Force for Soil Gas Intrusion into Houses
63116	02-112	Community Energy Management – Foundation Paper
62881	02-109	Composite Masonry Wall Ties
62888	02-108	Noise Isolation Provided by Gypsum Board Partitions
62955	02-105	Achieving Healthy Indoor Environments: A Review of Canadian Options
62944	02-104	Technology Dissemination: Triggering Innovation Adoption in Canada's Home Construction Industry
62950	02-103	Moldy Houses: Why They Are and Why We Care & Additional Analysis of Wallaceburg Data: the Wallaceburg Health and Housing Studies

RESEARCH HIGHLIGHTS: TECHNICAL SERIES

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62968	02-102	Transforming your practice: integrated design charrettes for sustainable buildings
62876	02-101	Healthy High-Rise: A Guide to Innovation in the Design and Construction of High-rise Residential Buildings
62960	02-100	Final Assessment of Conservation Co-op's Greywater System

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Order no.	Series no.	TITLE
63972	05-017	Acceptance of Manufactured Housing in First Nations Communities in Atlantic Canada
63981	05-014	Variations in Housing Prices in Canada
63948	05-013	Brownfield Redevelopment for Housing: Literature Review and Analysis
63918	05-012	The Impact of Zoning and Building Restrictions on Housing Affordability
63916	05-011	Measuring the Effort Needed to Climb Access Ramps in a Manual Wheelchair
63913	05-010	Critical Success Factors for Community Land Trusts in Canada
63922	05-009	Housing and Non-housing Construction Labour
63906	05-008	Evaluating Arterial Road Configuration Options for a New Community
63844	05-007	Variability in Construction Insurance and Alternative Insurance Solutions
63820	05-006	2001 Census Housing Series Issue 9: The Housing Conditions of Canada's Seniors
63840	05-004	2001 Census Housing Series Issue 8: Households Spending at least 50% of their Income on Shelter
63802	05-003	Housing Stability Validity Study
63812	05-002	Women Offenders: Characteristics, Needs and Impacts of Transitional Housing
63882	04-043	First Nation Economies: A Comparative Perspective. A Socio-Economic Baseline Study Between First Nation Communities and Non-First Nation Communities
63810	04-042	2001 Census Housing Series Issue 7: Immigrant Households
63797	04-041	Initial Demographic Analysis of the Home-Building Industry and Succession Planning
63795	04-040	Filtering in Housing

RESEARCH HIGHLIGHTS: SOCIO-ECONOMIC SERIES

Order no.	Series no.	TITLE
63758	04-039	Evolving Housing Conditions in Canada's Census Metropolitan Areas, 1991-2001
63760	04-038	Applying Fused Grid Planning in Stratford, Ont.
63692	04-037	Ideas that Work: Best Practices in Affordable Housing Management
63695	04-036	2001 Census Housing Series Issue 6: Aboriginal Households
63685	04-035	Developing a Methodology for Tracking Homeless People over the Long Term
63618	04-033	A Review of Training and Delivery Options Concerning Aboriginal Housing
63592	04-032	An International Comparison of Housing Need Indicators in Australia, Canada, England and the United States
63600	04-031	An Examination of the use of Domestic Space by Inuit Families Living in Arviat, Nunavut
63639	04-030	The National Summit on Affordable Homeownership
63596	04-029	Comprehensive Community Planning: Experiences in Aboriginal Communities
63573	04-028	Intergenerational Homesharing and Secondary Suites in Quebec City Suburbs
63580	04-027	2001 Census Housing Series: Issue 5 Growth in Household Incomes and Shelter Costs, 1991-2001
63575	04-026	Strategies to Preserve the Existing Rental Housing Stock in Greater Vancouver
63561	04-025	Refugee Housing Information Needs: Research Conducted in the Region of Niagara
63551	04-024	Assessment of the Outcomes for Habitat for Humanity Homebuyers
63526	04-022	UniverCity: Assessing Consumer Demand for Sustainable Development
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